Global Environment Facility (GEF)
United Nations Environment Programme (UNEP)

BIODIVERSITY DATA MANAGEMENT CAPACITATION IN DEVELOPING COUNTRIES AND NETWORKING BIODIVERSITY INFORMATION PROJECT

(BDM PROJECT)

FINAL EVALUATION REPORT

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Annexes

ACRONYMS AND ABBREVIATIONS

AusAID	Australian Agency for International Development
BEST	Bahamas Environment, Science and Technology Commission
BioRAP	Biodiversity rapid assessment project
CABI	Centre for Agriculture and Biosciences International
CATIE	Centro Agronomico Tropical de Investigacion y Enseñanza (Costa Rica)
CBIC	Canadian Biodiversity Informatics Consortium
CCAD	Central American Commission on Environment and Development
COABIO	Consulting Commission in Biodiversity (Costa Rica)
CONAMA	National Commission on the Environment (Chile)
DANIDA	Danish International Development Agency
EIN	UNEP environmental information networking unit
EIS	Environmental information system
ELADA 21	Electronic atlas of Agenda 21 (Poland)
ERIN	Environmental Resources Information Network (Australia)
ETI	Expert Centre for Taxonomic Identification
GEF	Global Environment Facility
GIS	Geographic information systems
GISL	Geographic Information Services Limited
GPS	Global positioning system
GRID	Global Resource Information Database of UNEP
IABIN	InterAmerican Biodiversity Information Network
IDRC	International Development Research Centre
IICA	Inter-American Institute for Cooperation on Agriculture (Costa Rica)
INBio	National Biodiversity Institute (Costa Rica)
INRA	Institute for Natural Resources in Africa (Ghana)
IUCN	World Conservation Union
NBSAP	National biodiversity strategy and action plan
OEPP	Office of Environmental Policy and Planning (Thailand)
SEPA	State Environmental Protection Administration (China)
SINIA	National environmental information system (Chile)
SINAC	National system of conservation areas (Costa Rica)
STAP	Scientific and Technical Advisory Panel
TNC	The Nature Conservancy
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
WCMC	World Conservation Monitoring Centre

EXECUTIVE SUMMARY

A. Introduction

1. The project on biodiversity data management capacitation in developing countries and networking biodiversity information (BDM project) was initiated by the United Nations Environment Programme (UNEP) in collaboration with the World Conservation Monitoring Centre (WCMC) to assist developing countries to meet their obligations under international agreements to organize, manage and use data on biodiversity. It is a $5.4 million project, of which $4 million was provided by the Global Environment Facility (GEF), $50,000 by WCMC and the balance provided by participating countries. It commenced in June 1994 and was scheduled to end in June 1998. In all, 10 countries, namely, Bahamas, Chile, China, Costa Rica, Egypt, Ghana, Kenya, Papua New Guinea, Poland and Thailand, participated in the pilot phase of the project. Each of these subprojects was allocated approximately $250,000 and the government contributions from the participating countries ranged from $30,000 to $400,000.

2. The overall objective of the project was to enhance the capacity of the developing countries in biodiversity data management in support of the implementation of the Convention on Biological Diversity. Biodiversity data and information management are essential components of virtually all articles of the Convention. Specifically, Article 7 (d) requires the Contracting Parties to "maintain and organize, by any mechanism, data derived from identification and monitoring activities". It is important to note that policy makers and managers do not need data, *per se*, but information derived from the data. It follows that, in addition to maintaining, storing and organizing data, the Contracting Parties will need to develop the capacity to analyse, evaluate and disseminate them in a usable form. The project contributes to the implementation of chapters 15 and 17 of Agenda 21, which highlight the need for the better information as the basis for the sustainable development and conservation of natural resources.

B. Project activities

1. *Consultative workshop*

3. The consultative workshop, held in October 1994 at UNEP headquarters in Nairobi, was the first encounter that the participants had with the BDM project and it was reported as being successful in providing an overview of the project. The BDM induction course helped to give an understanding of the BDM project. The information learned was transferred to the countries and utilized in BDM workshops and other project activities.

2. *National institutional surveys*

4. The national institutional surveys were successfully completed by all the countries and resulted in very useful products.

3. *Biodiversity information networks and the biodiversity data hub*

5. The project provided the necessary vision and building blocks to enable the participating countries to move into the information age. The strategies which have been developed call for a facilitated network architecture with ensured interoperability. Biodiversity information networks are proposed. The biodiversity data hub will operate a metadatabase system, essentially serving as a catalogue describing the various datasets, including their attributes. The hub will also serve as the clearing-house mechanism on the same basis as the clearing-house mechanism of the Convention on Biological Diversity, facilitating information exchange among participating institutions in formats suited to their data management needs and capacity.

4. *BDM plans*

6. The BDM plans provide the blueprints for the management of biodiversity data by government bodies, non-governmental organizations, research institutions, universities and the private sector in the participating countries. In summary, the BDM plans prepared by the participating countries focus on the following areas:

(a) Strengthening existing BDM institutions and enhancing their capacity to operate;

(b) Setting up and strengthening existing national biodiversity networks;

(c) Strengthening existing skills and building new capacity in biodiversity data management;

(d) Harmonizing and developing priority databases;

(e) Developing guidelines and standards for data management;

(f) Updating and following up on the national institutional surveys; and

(g) Identifying funding needs and sources for the implementation of the BDM plans.

5. *BDM workshops*

7. The BDM workshops were effective in improving understanding of biodiversity data management as well as promoting the understanding of the project objectives and the process of project implementation and also served as a vehicle for training, for discussions and for the sharing of experiences.

6. *BDM Update*

8. The BDM umbrella project published and distributed five issues of the newsletter *BDM Update* during the course of the project.

7. *National linkages*

9. National linkages were developed in the initial phase of the project during BDM workshops and training courses. This evaluation, however, found little evidence of regional and global linkages established as a result of the project. The BDM project developed strong inter-agency national linkages but very few regional and global linkages. Many linkages with the global biodiversity information networks could have been established or enhanced through the active participation of the BDM advisory committee.

C. Realizing project objectives

10. The BDM project complements three other global projects of UNEP related to the conservation and sustainable use of biodiversity. These are, first, the project on support to the preparation of biodiversity country studies, phases I and II; second, the Global Biodiversity Assessment; and, third, the national biodiversity strategy and action plans (NBSAPs) and the first national reports to the Convention on Biological Diversity.

11. On the whole, the BDM project has achieved its major goals. It has made a positive contribution towards improving biodiversity data management at the national biodiversity units, national focal institutions and various other institutions that participated in the project implementation. It has contributed to the raising of awareness on a wide range of biodiversity issues. Furthermore, the project outputs have influenced national policies on biodiversity and provided frameworks in the field of biodiversity data management which can subsequently be improved as more experience is gained.

D. Appropriateness of the project

12. The project appropriately met the needs of the participating countries in biodiversity data and information management and has become a key complementary activity in the preparation of NBSAPs, also called for by the Convention on Biological Diversity, in Article 6.

E. Project outputs

1. *Data management procedures and systems*

13. The BDM project assisted in the setting up of metadatabases that describe the datasets of participating national institutions. The guidelines and action plans make sound provisions for administrative procedures for data management covering such aspects as the clearing-house mechanism and the regulation of data access. Standard questionnaires to identify institutions relevant to biodiversity data management were developed. The BDM project developed structures and mechanisms for open information exchange to serve as national clearing-house mechanisms. It should be noted that only Chile, Costa Rica and Poland, among the participating countries, were able to establish clearing-house mechanisms. Costa Rica established a clearing-house mechanism at the metadatabase level with links to institutions with web sites.

14. All ten countries developed data management plans and guidelines. Implementation of the

plans has not been fully achieved, in most cases because of insufficient funding. The provision of additional funding is beyond the scope of the present BDM project, but it presents a challenge to the project partners, and makes the ultimate implementation of data management procedures developed through the project dependent on factors not incorporated in the original project design.

2. *Capacity-building and skills development*

15. The development of national BDM capacity and BDM skills is considered an outstanding achievement of the BDM project. The primary beneficiaries were the national biodiversity units and the national focal institutions. The project's contribution to developing capacity in other national institutions is not as clearly demonstrated.

F. Role and effectiveness of UNEP

16. The major roles of UNEP were considered to be administering funds and monitoring the subprojects. UNEP clearly played an important role in sparking interest in the field of biodiversity data management. During the project period, UNEP was very supportive in technical aspects and was particularly good in providing materials such as the Global Biodiversity Assessment. UNEP was also sympathetic and understanding, especially when the project was bogged down by government bureaucracy. In some countries, however, UNEP did not have adequate capacity and staff to provide the required technical support and field visits.

G. Lessons learned

17. The lessons learned from this evaluation may be subdivided into the areas of project design; implementation; and national capacities and the role of the beneficiary countries. A more detailed account of the evaluation findings in each of these areas may be found below, in chapter V, Lessons learned from the project. The major points are summarized here.

1. *Project design*

18. Generally speaking, the project's goals and activities were highly timely and appropriate for the developing countries, but its duration was too short for many countries which had to rely on limited in-country technical expertise. The participating countries did not have any input at the initial, concept and design stages. Surveys carried out in the countries prior to the design stage could have taken care of this. The duration of the project seems to have been arbitrarily decided upon, although the inputs by UNEP and WCMC, the experts meeting, the consultative meeting and the induction course helped to shape the pilot project, as it was a ground-breaking activity.

2. *Implementation*

19. Some of the countries were more successful in implementing the project activities than others. Key among the factors contributing to project success were the following: broad

political support and commitment, good telecommunication facilities, access to advanced information technology, existing in-country expertise, and good project management capacity. The BDM project should have taken into account such country differences and have analysed the factors explaining such differences. Pre-project surveys are important as a means of assessing the country needs and determining where more emphasis should be placed.

20. The lack of a full-time project coordinator at the country level was a problem in focusing the project and keeping the activities on track. On the other hand, the use of local consultants in implementing the project enhanced its acceptability among the stakeholders. The lesson here is that the use of local expertise not only ensures the project's acceptability but also enhances its implementation.

21. Several important institutions that manage biodiversity information did not participate in the BDM project. This failure was due either to lack of personal or institutional interest or to lack of credibility *vis-à-vis* large projects financed by international organizations, mainly attributable to the many projects which fail because of deficient follow-up after the funding has been used up.

3. *National capacities and the role of the beneficiary countries*

22. While the strategic location of the project focal point at a central government body with a high-level mandate allowed the project to form partnerships with key national stakeholders and gave it access to a wide range of resources and audiences, there are serious gaps in the skills and knowledge needed to manage biodiversity data in the developing countries and there is a clear need for training at all levels. The BDM project has just started to address this need.

4. *Conclusion*

23. Overall, the project was a catalyst in generating interest in the emerging issues of biodiversity data management and mobilizing available national expertise in this field. More awareness-raising and publicity about biodiversity data management and the project were needed to facilitate networking and fund-raising efforts. There was also a need to give more acknowledgement of GEF to increase the visibility of this organization.

I. Emerging issues

24. There is a serious lack of existing national capacity for biodiversity data and information management in the developing countries. Human resource needs were identified in the areas of data analysis, computer programming, geographic information systems (GIS) technology, use of the Internet, creation of web pages, project management, project monitoring and evaluation, and public relations. To ensure the overall success of the project, the implementation of the BDM plans is essential. Such implementation will require further financial support.

25. It is essential to implement a second phase of the BDM project to build on what has already been achieved and, at the same time, to extend its impact at the national, regional and

global levels. The implementation of BDM plans and promotion of data exchange between institutions is essential. This should be linked to the efforts under way to prepare NBSAPs. The BDM activities would be complementary to those of NBSAPs.

26. At the time of this evaluation there are a number of countries that have not completed their project outputs. The issue of non-completion of project outputs is related to project design, lack of capacity and inadequate monitoring and supervision. These aspects of the BDM project should be reviewed. A mechanism should be put in place to ensure that the project outputs are eventually completed and disseminated to all the stakeholders.

27. Sustainability was not built into the BDM project, although the participating countries were requested to identify sources of funding for implementing the BDM plans. The BDM project is not fully sustainable without further donor funding. A greater exploration of options for continued financing of BDM activities should be undertaken within the participating countries and others intending to implement BDM-type activities.

28. With the exception of a few of the participating countries, the private sector was not involved in the BDM process. More stakeholder representation was needed in the national institutional survey process.

29. The products of the BDM project should be published and disseminated widely. Formal systems of information flow and exchange to promote and facilitate scientific and technical cooperation, or clearing-house mechanisms, should be established and the obligations of governmental agencies defined to ensure participation of relevant sources of information. The BDM project could be used as a model for the national development of the clearing-house mechanism. The processes of consultations, national institutional surveys, formulation of best practices and strategic planning could be packaged to help countries develop national clearing-house mechanisms.

J. Recommendations

1. *Financial and technical assistance*

30. Implementation of the plans remains doubtful, unless external support in terms of both finances and technical assistance is provided. The issue of the implementation of the BDM plans should be the focus of serious attention by GEF and UNEP.

2. *NBSAPs*

31. Linkage of the implementation of BDM plans to the ongoing activities of NBSAPs as a complementary activity is essential, since the BDM plans are crucial in providing the information and data required for the success of NBSAPs.

3. *Capacity-building*

32. There is an urgent need for capacity-building, training and awareness creation in the area of biodiversity data management in the developing countries. In those countries where the national capacity in biodiversity data management is low, the project should focus primarily on capacity-building and skills development through more training sessions and workshops.

33. A high-level multisectoral steering committee representing the interests of the major stakeholders at the national level should be established at the outset of the project.

34. In future BDM projects, the trained people who have been involved in implementing the current BDM project could offer biodiversity data management training to new countries with deficiencies in information technology personnel.

4. *Sustainability*

35. UNEP and GEF should support similar activities with a new group of countries. Consideration should be given to countries close to those which have already carried out the project, in order to initiate the component of regional linkages and collaboration. The lessons learned in the pilot phase should be taken into careful consideration in designing these new projects. The sustainability of BDM projects should be considered at the project design stage and every effort should be made to ensure that those outputs which are still incomplete are fully achieved. Short-term technical missions should be carried out to assist countries to complete the process.

5. *Publication*

36. UNEP and GEF should consider the production of a short publication summarizing the results of the BDM project. This "know-how" publication on BDM experiences should be designed for a very wide audience, including senior government decision-makers and non-governmental organizations internal and external to the project. It should be placed on the Internet and also distributed by other means such as e-mail and hard copy.

6. *BDM plans and mid-term meeting*

37. The future of the BDM project is dependent on the implementation of the BDM plans. UNEP and GEF should provide support to the 10 participating countries to implement the BDM plans. If this does not happen, the efforts made during the pilot phase of the project may not amount to much since there is a likelihood that, without additional support, the BDM project will come to a grinding halt.

38. Finally, it is recommended that, for future projects, the project managers of the participating countries should hold a meeting mid-way through the project, in order to share their experiences in implementing the project.

I. INTRODUCTION

39. This chapter contains background information on the project on biodiversity data management capacitation in developing countries and networking biodiversity information (BDM project), details of the evaluation objectives, and a description of the methodology used in conducting the evaluation.

A. Background of the BDM project

1. *Genesis*

40. The BDM project was initiated by UNEP and WCMC in response to Article 7 (d) of the Convention on Biological Diversity, which identifies the requirement to maintain and organize data derived from identification and monitoring activities, and to facilitate the building of national capacity for biodiversity data management and exchange as required by the Convention on Biological Diversity. The project also contributes to the implementation of Agenda 21, especially chapters 15 and 17, which highlight the need for better information as a basis for sustainable development and conservation of natural resources.

41. Article 7 of the Convention on Biological Diversity is concerned with the identification and monitoring of activities to support Articles 8-10 (*in situ* conservation, *ex situ* conservation and sustainable use of components of biological diversity). Contracting Parties are required:

(a) To identify components of biological diversity important for its conservation and sustainable use (Article 7 (a));

(b) To identify activities likely to have adverse impacts on biological diversity (Article 7 (c)); and

(c) To monitor the status of both the impacts on and threats to biological diversity (Articles 7 (b) and 7 (c)).

42. The project proposal was endorsed by the participants' meeting held in Abidjan in December 1992 and was included in the GEF work programme in the Fourth Tranche. Following a period of planning and consultation, during which UNEP sought advice and guidance from experts around the world, the project was approved by GEF in June 1994.

43. Initially focusing on the needs of developing countries and the biodiversity data compiled by countries while conducting their country studies on biological diversity, the BDM project aimed at mobilizing these data as a key instrument in building enhanced national capacity for preparing NBSAPs, in accordance with Article 6 (a) of the Convention on Biological Diversity.

2. *Objectives*

44. The overall objective of the BDM project was to enhance the capacity of developing countries in data management to support the implementation of the Convention on Biological Diversity. The project was designed to assist developing countries in addressing the following specific objectives:

(a) To assess their requirements for data management and application for the implementation of the Convention on Biological Diversity;

(b) To strengthen national mechanisms and institutions for access to and dissemination of national biodiversity information;

(c) To organize data compiled through, *inter alia*, the country study process and to develop mechanisms for the continued collection and management of information;

(d) To enhance existing ability and skills to utilize the relevant technologies and know-how in data management;

(e) To develop linkages with national, regional and global networks relevant to biodiversity information, its exchange and management; and

(f) To apply a series of information management tools, including guidelines and standards for data management.

The BDM project was intended to provide a "tool box" for data management from which countries could select technologies that would suit their needs involving both North-South and South-South cooperation.

3. *Timeline and participating countries*

45. The project commenced in June 1994 and was scheduled to run until June 1998. The following 10 countries participated in the project: Bahamas, Chile, China, Costa Rica, Egypt, Ghana, Kenya, Papua New Guinea, Poland and Thailand. The project cost is $5.4 million, of which $4 million is funded by GEF, $50,000 by WCMC and the balance provided by participating country contributions, ranging from $30,000 to $400,000.

46. In the selection of the countries for project implementation, the following factors were taken into consideration:

(a) Country policy framework for data management;

(b) Country needs in relation to national capacity for biodiversity data management;

(c) Countries that have ratified the Convention on Biological Diversity;

(d) Countries that have undertaken or are undertaking country studies, NBSAPs or similar initiatives; and

(e) Advice from UNEP regional offices.

4. *Support materials*

47. A subproject agreement was made with WCMC in June 1994 for the preparation of a set of BDM support materials to raise the profile of biodiversity information in decision-making and to help countries establish data and information management programmes in support of the national plans and actions required in implementing the Convention on Biological Diversity.

48. The materials prepared by WCMC are:

(a) *Guide to National Institutional Survey in the Context of the Convention on Biological Diversity* (UNEP/WCMC, 1998), which aims to assist countries in surveying and assessing the state of their capacity for managing biodiversity. This document proposes a framework to record the involvement of national institutions in the collection, management and use of biodiversity data, and to reveal what procedures, resources and data each institution utilizes;

(b) *Guide to Information Management in the Context of the Convention on Biological Diversity* (UNEP/WCMC, 1996), which proposes a step-by-step information cycle developed from an agreement on priority issues, determination of information needs, design of information products, stakeholder roles and enablement of stakeholders to ensure information is produced in a cost-effective manner. The guide was distributed to the Conference of Parties to the Convention on Biological Diversity at its third meeting, held in November 1996, in Buenos Aires, Argentina;

(c) *Electronic Resource Inventory* (UNEP/WCMC, 1995), which provides a wide range of information and reference directories on software, hardware, methodologies, standards, common practices, data sources, key organizations and exemplary projects related to biodiversity data management. The Electronic Resource Inventory was distributed at the second meeting of the Conference of Parties to the Convention on Biological Diversity, held from 6 to 17 November 1995, in Jakarta, Indonesia.

49. The *Guide to National Institutional Survey* was not published until after the guideline had been pre-tested by three countries─Ghana, Poland and Thailand. In addition, the participating countries were given a chance to test the guidelines and make comments on the draft document. The *Guide to Information Management* was reported to be too theoretical, abstract, detailed and complicated. This *Guide to Information Management* and the national institutional survey guidelines were revised at various times before publication. The final documents, which were published later during the BDM process, are easy to use. The *Electronic Resource Inventory* was user-friendly and was put to effective use.

5. *Key activities*

50. Each of the 10 countries was to carry out the following key activities:

(a) To conduct a national institutional survey, to determine the national capacity for data management;

(b) To prepare a national plan for the management and application of biodiversity data in support of the Convention on Biological Diversity;

(c) To develop a series of basic guidelines to support efficient information management; and

(d) To compile a resource inventory as a "tool box" of available methods and technologies from which it could draw upon selectively to suit its needs, involving both North-South and South-South cooperation.

6. *Projected outputs*

51. The principal output of the BDM project as envisaged during the project development was a national biodiversity data management plan (the BDM plan) to support the implementation of the Convention on Biological Diversity, as required under Article 7 of the Convention. Each of the 10 developing countries was to produce the following specific outputs:

(a) Institutional survey report covering existing national capability for data management and identifying problems and priority actions necessary to solve these problems;

(b) National plan for the management and application of biodiversity data in support of the implementation of the Convention on Biological Diversity;

(c) Series of basic guidelines which would provide support to the development of efficient information management practices within the context of the Convention on Biological Diversity; and

(d) Resource inventory: an open-ended inventory on tools for analysis, methodologies, software, networks, individuals and organizations with appropriate experience and sources of information and networks. This would be made available electronically and in hard copy to allow users to evaluate existing resources for biodiversity data management system implementation.

B. Final evaluation: objectives and methodology

52. This final evaluation is intended to assist the GEF Monitoring and Evaluation Programme and the Evaluation Unit of UNEP in assessing the extent to which the BDM project has helped

enhance the capacity of participating countries in biodiversity data management and exchange, as required by the Convention on Biological Diversity, covering, *inter alia*:

(a) The project's contribution to the biodiversity planning process;

(b) How, and to what extent, the project objectives were met;

(c) The quality, effectiveness and usefulness of the project outputs;

(d) The project's contribution to ongoing and emerging initiatives, such as the clearing-house mechanism of the Convention on Biological Diversity;

(e) The process followed by countries in undertaking biodiversity data management at the national level; and

(f) The overall role and effectiveness of UNEP in project implementation.

53. The evaluation report has been prepared using four sources of information: the local consultants' reports from the 10 subprojects; the project and subproject documents (reports and outputs including newsletters); literature review; and the evaluator's own experience in biodiversity conservation and the BDM project. The evaluator has analysed the evaluation results of the 10 subprojects, project outputs and activities, and has drawn certain conclusions and recommendations. A list of the documents reviewed during this evaluation is provided in annex 1 of this report.

II. PROJECT INITIATION AND IMPLEMENTATION

54. Chapter II of this evaluation report assesses the effectiveness of the pre-project initiation activities and the project implementation activities. Specifically, this chapter deals with the countries' participation in the BDM consultative workshop and the BDM induction course. In addition, details are provided on the implementation of the BDM project activities, including the national institutional survey, the BDM workshops, the BDM plans, the information management guidelines, the resource inventory, and the newsletters.

A. Pre-project activities

1. *Consultative workshop*

55. A consultative workshop was held in October 1994 at UNEP headquarters in Nairobi, with the participation of 22 countries, namely Australia, Bahamas, Canada, China, Colombia, Costa Rica, Egypt, Germany, Ghana, Guyana, Indonesia, Kenya, Morocco, Mozambique, Nigeria, Norway, Papua New Guinea, Peru, Poland, Thailand, Uganda and the United Republic of Tanzania. Two of the important objectives of the workshop were:

(a) To examine how the institutional surveys would be conducted; and

(b) To discuss the principles and arrangements for selecting the 10 countries to participate in the pilot phase of the BDM project.

56. Following the receipt of formal expressions of interest by Governments before the deadline of 31 January 1995 set at the consultative workshop, and using the criteria elaborated during the consultative meeting, the following 10 developing countries were selected to participate in the first phase of the project: Bahamas, Chile, China, Costa Rica, Egypt, Ghana, Kenya, Papua New Guinea, Poland and Thailand. The legal mechanism for undertaking project activities at the national level was through subprojects, concluded between UNEP and the national biodiversity units or selected national focal institutions of the participating countries.

57. The activities carried out during the workshop were more related to administrative and policy aspects than to technical issues. Notwithstanding Thailand's absence from the meeting and its non-ratification of the Convention on Biological Diversity, the country was selected to participate in the BDM project on the basis of its ongoing project on a country study on biological diversity and following discussions with a UNEP official during the country study process.

2. *BDM induction course and peer review*

58. The BDM induction course was hosted by WCMC and held in Cambridge, United Kingdom of Great Britain and Northern Ireland, from 2 to 6 October 1995. It was funded from the BDM umbrella project. Drafts of the supporting materials prepared by WCMC were also peer-reviewed. The course and the peer review were attended by nine of the ten participating countries. Participants from China were unable to attend. The peer review was also attended by three members of the BDM advisory committee.

59. During the first three days of the course, participants discussed topics of direct relevance to the implementation of the BDM project. Presentations on the testing of the guidelines for national institutional surveys were given by participants from Ghana, Poland and Thailand. The final two days were devoted to peer review of the BDM supporting materials.

60. A major recommendation of the peer review was to merge the data-flow model and the guidelines for information management into a single document and to provide an additional component on user needs. The revised document was submitted to UNEP in February 1996 and was subsequently sent to the participating countries and members of the advisory committee for comments.

61. The course was reported to be extremely beneficial in providing an understanding about the BDM project in general. The information learned was transferred to the countries and utilized in BDM workshops and other project activities. Documents presented at the BDM induction course provided useful references during the early implementation stage of the BDM subprojects. This initial input was viewed as critical in understanding new biodiversity concepts which previously had not been well understood. Some countries disseminated the materials obtained from this course to participating national agencies.

62. One of the participating countries, however, found the draft guidelines too theoretical and complex for the implementers. On returning home from the course, the country's representative experienced some difficulties in translating the theory into practice. This problem was not identified at a sufficiently early stage. The project coordinator had to struggle with the initial implementation of the project and the first output was not completed until 12 months later. Consequently, the project has fallen behind schedule and the majority of the products have yet to be completed. It would have been appropriate for UNEP to send one or two technical missions to check up on the project.

B. Project activities

1. *National institutional survey*

63. The national institutional surveys were carried out through the use of questionnaires and the conduct of on-site visits. The questionnaires were based on the support materials developed by WCMC in collaboration with UNEP. The model questionnaire developed by WCMC was tested and modified for application in the participating countries. The questionnaires were circulated to government departments, educational establishments, state enterprises, non-governmental organizations and the private sector. For each dataset, the following information was requested: contact; institutional skills; data and information coverage (geographical region, taxonomic groups, purpose, time period, etc.); data management (storage medium, cataloguing method, software used, persons responsible, regularity of updates); and datasets. The response rate to the questionnaire from the stakeholder institutions varied as follows: Ghana–25%, Thailand–34%, China–41%, Poland–44%, Kenya–45%, and Papua New Guinea–72%. Several countries had to revisit the exercise and undertook second runs of the surveys. Based on these responses, the participating countries compiled their national institutional survey reports. The *Guide to National Institutional Survey* was not published until after the national institutional surveys were carried out. Each of the participating countries had a chance to comment on the draft guidelines.

64. The national institutional survey reports identify the major databases, major gaps in the data and the existing resources within the institutions surveyed. Despite the low level of responses in some countries, as shown above, the surveys have definitely captured the major biodiversity collections and the institutions managing the data. A major gap identified by the national institutional surveys was the lack of sufficient data on the lower forms of life such as algae, fungi, bacteria, and nematodes. The surveys found that biodiversity data was held in the sectoral areas of policy, information, health, forestry, fisheries, education, conservation, commerce and agriculture. Non-governmental organizations and private sector institutions also held a substantial amount of biodiversity data and information. The national institutional survey reports were used as the basis for the formulation of the BDM plans which would define the data management needs for the implementation of the Convention on Biological Diversity in the participating countries.

65. This project activity was successfully completed by all the countries and resulted in very useful products. The national institutional survey reports are already being used as reference documents by researchers searching for existing datasets. The reports have also resulted in increased awareness of the importance of efficient data management for effective biodiversity conservation. The results of the surveys revealed that some institutions had biodiversity data and information but were not aware that they had it. The national institutional survey reports also revealed that there was a limited number of trained personnel in the developing countries who had the capability to handle biodiversity information.

66. The reports further identified several needs of institutions that handle biodiversity data and information. Among the key needs are: training on biodiversity data management; electronic communication and networking (Internet and wide area network); computer hardware and software; and field and laboratory equipment. The reports identified an urgent need for capacity-building, training and awareness on biodiversity data management. They revealed that many organizations lacked adequate knowledge on the state of information technology, especially hardware and software, to be able to identify and articulate their needs. Many of those institutions which did not submit their questionnaires were intimidated by that portion of the questionnaire that dealt with computer hardware and software.

67. Some difficulties encountered in carrying out the surveys arose from the respondents' lack of understanding of what constituted biodiversity, problems in logistical arrangements and general apathy among some institutions in indicating what data they had. Some of these problems were attributed to the fact that similar previous surveys of data sources were not acknowledged, nor were the results of such works sent back to the data owners. Despite the likelihood of some gaps in their institutional coverage, the national institutional survey reports are expected to become widely used reference tools once they are published. The updating of the national institutional survey is seen as a future activity and is included in the BDM plans.

68. As a result of this activity, a version of the electronic atlas of Agenda 21 (ELADA) for Poland was completed in English and work on preparing a Polish version is at an advanced stage. This product was developed as a joint international project with the Canada Centre for Remote Sensing and the International Development Research Centre (IDRC). The ELADA software provides multimedia tools and a set of analytic tools and map-making capabilities typical of geographic information systems. More than 500 datasets on ecosystems, species, environment and human activities attached to the demonstration programme enhance the understanding of global biodiversity issues. In Costa Rica, a web site with the national institutional survey results, full metadata, and documentation of the project was set up in mid-1996, under the address http://www.inbio.ac.cr/~bdm/home.html.

2. *Information management guidelines*

69. According to the project document, a series of data management guidelines was to be formulated to facilitate the development of efficient information management practices within the context of implementation of the Convention on Biological Diversity. The participating countries were expected to adapt and fine-tune a series of basic guidelines for national use, based on drafts provided by WCMC and UNEP, to support efficient data management and information flow. Efforts were made to adapt these guidelines to suit the circumstances of participating countries. The guidelines were to address technical, organizational and management aspects of the BDM systems. This was done with the realization that organizational and management aspects have as much to contribute to the BDM systems as technical guidelines.

70. The guidelines begin with the identification and prioritization of biodiversity conservation issues of concern and include the assessment of information and user needs, local and physical design of the BDM systems, selection of hardware and software, and the implementation of biodiversity data management systems. They provide the guiding principles which should be used to facilitate the development of a BDM system that would enhance data and information exchange for decision-making. They also provide useful tools for use in managing data. Once these are institutionalized, they will positively influence biodiversity data management in the developing countries. The *Guide to Information Management* was translated into Spanish in 1997, to reach a wider audience. About 200 copies were distributed to national stakeholders in Costa Rica and other Spanish-speaking countries.

71. The focal national institutions, in cooperation with their project steering committees, reviewed the WCMC guidelines to support information management. The revised guidelines were subsequently pilot-tested, further refined, and then distributed to the participating institutions during the BDM workshops. The guidelines provide extremely detailed data structures for a wide variety of databases, covering a huge range of variables relevant to biodiversity information management.

72. Although there are no technical problems with the guidelines, this project output may be the most controversial product of the BDM project. There seems to be much contention over the data structures proposed, especially among the potential data providers. There is a recognized need to move towards standardization of data collection methodology but this will require consensus among the wide range of biodiversity data management stakeholders.

73. An informal biodiversity information network, comprising institutions that are custodians of biodiversity data, is proposed. The guidelines also suggest administrative measures for data management and the selection of personnel and propose BDM standards. The network would operate on the same basis as the clearing-house mechanism of the Convention on Biological Diversity, facilitating information exchange among participating institutions in formats suited to their data management needs and capacity. The production of the information management guidelines has not been completed in the case of Ghana, although work on this activity is at an advanced stage.

3. *National resource inventory*

74. The national resource inventory provides a wide range of information and reference directories on software, hardware, methodologies, standards, common practices, data sources, key organizations, and exemplary projects related to biodiversity data management. It is one of the three BDM supporting materials developed by WCMC.

(a) *Kenya*

75. From the results of the national institutional survey in Kenya two products were developed. The first is the national resource inventory, which describes in detail the kind of data found in various organizations based on broad categories, e.g., vegetation, and lists the manpower available in these institutions. The national resource inventory includes a list of publications by various experts in biodiversity again based on broad categories. The inventory is developed as a searchable tool, and a user guide has been written. The second product developed is a metadatabase of all institutions that handle biodiversity data and information. The metadatabase is both in print and electronic form. It is searchable and is developed for users requiring the electronic format. The metadatabase and its guide have been prepared as WordPerfect documents in response to the realization that most institutions use WordPerfect or compatible word processors.

(b) *China*

76. The China Biodiversity Information Resources Catalogue was released in September 1997. It is a comprehensive catalogue of materials from within China and abroad. Much of the international material, including web sites, e-mail addresses, software resources, etc., is based on the materials in the Electronic Resource Inventory prepared by WCMC and UNEP. The Chinese Resource Inventory also catalogues resources specifically applicable to China, such as electronic data sources, printed data sources in monographs and journals, relevant activities of research and administrative institutions, specimen holdings, and addresses and summaries of holdings in Chinese public and institutional libraries.

(c) *Papua New Guinea*

77. In Papua New Guinea, the national resource inventory is captured in the Catalogue of Biodiversity Data Holdings for Papua New Guinea. The inventory is electronically recorded in the form of a metadatabase maintained by the Biodiversity Assessment Branch of the Department of Environment and Conservation.

(d) *Egypt*

78. In Egypt, this activity consisted of two main components. In the first component, a national biodiversity database was established as the foundation of a national information network. The information from the national biodiversity country study was processed and organized in a format useful for decision-making and entered into the national biodiversity database. In response to the need for information availability, additional datasets have been developed and integrated into the database. The national biodiversity unit introduced an added dimension to the database by creating a collective list of references encompassing all groups of Egyptian biota, constituting a kind of biodiversity library of Egypt. The national biodiversity database will be invaluable to teachers, students, researchers, and decision makers. The database is also expected to be an important tool for information management and exchange.

(e) *Costa Rica*

79. INBio in Costa Rica is still processing the information that arrives from time to time to feed into the country's national resource inventory. Costa Rica decided to implement the national resource inventory as a database rather than as a document. It considered that the material would soon become out-of-date and of limited use. This decision led to additional work which is expected to result in a better product. Software development was completed in December 1997 and the CD-ROM containing the information and software to access it will be released in 1998.

(f) *Ghana and Thailand*

80. Ghana and Thailand have not completed this project activity. In Ghana, there seem to have been difficulties in modifying software for the national resource inventory. Although this project activity is estimated to be only 10% complete, the focal institution has indicated that this output will be completed by early September 1998.

81. In Thailand, the national resource inventory has not yet been compiled, owing to technical problems and difficulty in interpretation of the UNEP/WCMC resource inventory. The Office of Environmental Policy and Planning considered that there were two parts to the inventory according to their interpretation of the WCMC manual. The first deals with electronic resources, software, hardware, etc, while the second covers institutions, personnel and libraries. This second part is near completion. It covers training institutes, Internet providers, electronic networks, CD-ROMs, libraries and journals. The Office hopes to make this available in diskette form or on CD-ROM and to place the information on the Internet.

82. From the findings of the evaluation, it appears that the participating countries had difficulties understanding the national resource inventory and most of the countries considered it of limited use as originally proposed.

4. *BDM plans*

83. In accordance with the BDM project document, a national BDM plan was to be produced by the participating countries to cater for the efficient management and application of data and information in support of the Convention on Biological Diversity. This was to be based on the *Guide to Information Management*. Depending on individual country needs, the BDM plan would include, *inter alia*:

(a) Identification of agencies responsible for subsequent implementation of the plan;

(b) Implementation schedule;

(c) Identification of priority data sources and networking needs between national organizations;

(d) Development of inter-agency agreements on data exchange;

(e) Identification of data management needs;

(f) Identification of appropriate technologies and know-how;

(g) Plan for database development and harmonization;

(h) Identification of training and equipment needs;

(i) Identification of national experts that could support the implementation of the plan;

(j) Identification of appropriate information networks to use in support of national and regional biodiversity activities; and

(k) Identification of additional sources of funding.

84. The BDM plans provide the blueprints for the management of biodiversity data by government institutions, non-governmental institutions, research institutions, universities and the private sector in the participating countries. In summary, the BDM plans prepared by the participating countries focus on:

(a) Strengthening existing BDM institutions and enhancing their capacity to operate;

(b) Setting up and strengthening existing national biodiversity networks;

(c) Strengthening existing skills and building new capacity in biodiversity data management;

(d) Harmonizing and developing priority databases;

(e) Developing guidelines and standards for data management;

(f) Updating and following up on the national institutional surveys; and

(g) Identifying funding needs and sources for the implementation of the BDM plans.

85. The plans constitute not only one of the BDM project's most important activities, but also an important precursor of NBSAPs. They will promote the development of new databases and information products to support the decision-making processes and information exchange. The plans will also promote the implementation of biodiversity information networks. A summary of the information contained in the BDM plans of the participating countries is presented below.

(a) *Bahamas*

86. The Bahamas national BDM plan was prepared by the Bahamian Environment, Science and Technology (BEST) Commission in October 1997. The plan is presented as three levels of

interactions: policy, strategy and operations. The natural resource policies of the Bahamas are developed at the policy level through interactions among the Office of the Prime Minister, the Cabinet, Parliament, and the judiciary branches of the Government. The BEST Commission occupies the strategic level and is responsible for developing NBSAPs and for prioritizing and coordinating data and information needs. The operations level consists of all the Bahamian institutions, field stations, individual scientists, and *ex situ* collections involved with natural resources and biodiversity in the Bahamas. The plan outlines the following: interactions of policy and strategic levels; interactions of strategy and operations levels; interactions of policy and operations levels; and interactions with international organizations and conventions. The BEST Commission will play the role of the hub. In order for the national biodiversity management plan to be implemented successfully, the BEST Commission must be established as a fully functional, legislated government agency with an appropriate budget and staff to fulfil its mandates. The plan does not include an implementation schedule or a budget.

(b) *Chile*

87. The BDM plan for Chile is entitled: "Action Plan for the Establishment of a Biodiversity Information System in Chile". It was prepared by the National Commission on the Environment (CONAMA) in November 1997. The overall objective of the plan is to organize and manage information on biodiversity in a system which sustains the decision-making process in the various fields that influence or affect biodiversity. The specific objectives are the following: to promote inter-institutional cooperation and develop working networks on biodiversity; to establish a tool to promote the sustainable use of biological resources and to increase the availability of information on biodiversity; to facilitate the exchange of information between institutions at the national level; to prepare guidelines and standards for the gathering, processing, presentation and dissemination of biodiversity information; to promote joint actions for fund-raising to support expansion of the information system, training, and technological development; and to serve as a national yardstick for information on biodiversity, guiding the development of indicators and information products to meet the needs of different types of users.

88. The components of the plan are the following: developing the strategy criteria for the biodiversity information system; consolidating and testing the information system; formalizing institutional agreements; initiating the operation of the biodiversity information network; and standardizing and strengthening the technological capacities of the institutions related to the network. Implementation of the plan is scheduled to take one year and the total budget is $600,900. The funding sources are local (CONAMA) or foreign (as yet unidentified). CONAMA is expected to contribute about 25% of the total budget.

(c) *China*

89. The China BDM project group prepared the country's national plan for biodiversity data management in June 1997. The goal of China's BDM plan is to provide accurate and reliable data and information to the decision makers. The plan has been developed with the following aims: to set up an effective organization system for biodiversity data and information management; to establish a policy system for regular management of biodiversity data and information; to set up standards for management of biodiversity data and information; to build a nation-wide biodiversity information networking system; to build a nation-wide integrated biodiversity database system; and to set up a personnel training system for biodiversity data management. Implementation of the BDM plan is divided into two phases, each lasting five years. The first phase will accomplish the following: establishment of a national centre and sub-centres of biodiversity information; establishment of an information networking system; formulation and signing of agreements on biodiversity data sharing among data custodians; development of technical guidelines and standards on biodiversity data management; and collecting, organization and updating of data to lay the foundation for a national biodiversity information system. The second phase of the project is expected to build on the activities initiated in the first phase.

90. Capacity-building and skills development constitute a major component of China's BDM plan. This will be carried out in the following areas: application of software in biodiversity data management; data analysis and modelling; GIS, global positioning system (GPS); computer networking; standards of biodiversity data management; and the understanding of intellectual property rights and copyright of biodiversity information. Training will be conducted within the country and abroad. The BDM implementation timetable runs from 1997 to 2006. The first phase of the project will require $12.1 million. The plan does not identify the funding sources nor does it indicate which institution will undertake which activity.

(d) *Costa Rica*

91. The national plan for biodiversity information management in Costa Rica is the culmination of two years' hands-on work carried out by the BDM team. The plan is not only one of the BDM project's important products, but also an important part of the country's national biodiversity strategy. The objective of the plan is to promote the development of new databases and information systems to support the decision-making process and support information exchange, generation and dissemination and the sustainable use of biodiversity. The plan revolves around the implementation of the BioData network officially established on 9 April 1997. The specific objectives of the plan are the following: to identify the information and training needs of the stakeholders; to contribute to the design, development and maintenance of information products that fulfil the information needs of the stakeholders; to create and keep up-to-date documentation on institutional infrastructure, the resource inventory, and metadata of datasets; to create mechanisms to facilitate communication and information exchange among the stakeholders; to promote the incorporation and participation of new stakeholders in the network; and to support the elaboration of the country study, country report, and the national biodiversity strategy.

92. The activities to achieve the specific objectives include: first, analysis and definition of information needs and training needs; second, design, development and maintenance of information products; third, development and maintenance of documents concerning institutional infrastructure, the resource inventory and the meta-database; and, fourth, development of communication mechanisms and information exchange mechanisms. It is planned to carry out these activities in a collaborative fashion. The Consulting Commission on Biodiversity (COABIO) and INBio will be involved in the first set of activities (analysis and definition of information needs and training needs); ITRC, CIT, the Centro Agronomico Tropical de Investigación y Enseñanza (CATIE), the Inter-American Institute for Cooperation on Agriculture (IICA), INBio and universities in the second set of activities (facilitating the design, development and maintenance of information products); INBio, in the third set of activities (maintenance of documents and databases); and, finally, all members of the network in the fourth set of activities. The national system of conservation areas (SINAC) will be a key player in the implementation of the plan. A budget of $240,000 to cover a four-year period is required. The implementation schedule specifying actual dates is not included in the plan.

(e) *Egypt*

93. The BDM plan in Egypt was prepared by the national biodiversity unit, which was established as the focal point for implementing the Convention on Biological Diversity in Egypt. The plan has the following aims: collecting data on biodiversity in Egypt (referral collections, research institutions, etc.); transforming data into information which would be made available and useful to users (researchers, politicians and decision makers); and, by so doing, supporting the national contribution to the implementation of the Convention on Biological Diversity. The plan encompasses the following components: formulation of a programme for completion of the biodiversity inventories initiated in the country study; identification of centres that are sources of data through a national institutional survey; management of the data available from country study publications; identification of the target audience that would use the data and information; development of modalities for inter-agency organizations and institutions linkages and information flow; development of means and forums for exchange of information; development and promotion of collaborative programmes at national, regional and international levels; and development of a methodology for the implementation of the plan.

94. The expected results of the implementation of the BDM plan in Egypt are the following: mechanisms and trained personnel for accessing, maintaining and disseminating information on biodiversity; linkages with a network of national, regional and international networks; completion of the country study project on biodiversity; definition of national needs for implementing biodiversity data management in support of the Convention on Biological Diversity; and identification of technical and financial support and assistance for implementing the plan. Potential donors include the United States Agency for International Development (USAID), ARCD, the Danish International Development Agency (DANIDA), World Conservation Union (IUCN) and UNEP. The plan will be implemented from December 1998 to February 2000 and will cost $670,770. The national biodiversity unit will play the lead role in the implementation process.

(f) *Ghana*

95. The draft Ghana BDM strategy was prepared in August 1997 by the Remote Sensing Applications Unit of the University of Ghana for the Ministry of Environment, Science and Technology. The strategy document covers the following areas: background to the preparation of the strategy; national development context; biological resources in Ghana; biodiversity information; data resources; data handling; management of biodiversity data; and capacity development. The outputs and activities proposed in the strategy include: the Ghana biodiversity report; a biodiversity data compendium; the Ghana biodiversity update (newsletter); a national biodiversity assessment; executive seminars; public awareness programmes; and electronic publishing.

96. A Ghana BDM system is proposed. For the effective development of the system, the following structure is proposed: an inter-agency steering committee to provide a mechanism for coordination and policy formulation; a Ghana BDM system technical committee to oversee the development and technical implementation of the system; a network of data centres; and a Ghana BDM system hub to facilitate the flow of data and information. A three-year phased implementation schedule is envisaged for the system. It is estimated that this is the time required to build the national capacity essential for the development of an operational and a self-sustaining system. Provision is made for local and international consultants to review specific infrastructural requirements for hardware, software and training.

97. The strategy's implementation plan covers the following major components: support for institutional network development; training; development of a biodiversity data infrastructure; information products; and consultants. Implementation of these components over a period of three years will cost $400,000. Funding sources have not been identified. The implementation plan does not indicate which institutions will be responsible for undertaking the activities outlined in the strategy.

(g) *Kenya*

98. The Kenya BDM plan, dated December 1997, was developed by the National Environment Secretariat of the Ministry of Environment and Natural Resources, as part of the BDM project. The plan contains details of the country's BDM resources, including information technology equipment needs, the management framework, legal status, available national expertise and training needs, and other issues which underpin the current management regimes. The training courses identified as suitable for improving the capacity of Kenya to manage biodiversity data include: database management, information networking, systems development and programming, environmental modelling, GIS,information system planning, and data processing. The plan also details the information required to manage biodiversity in Kenya and the minimal data needed to develop an information system. These details have been used to design the Kenya biodiversity information system, which features, *inter alia*, a conceptual model of the system, a logical database model and a generic model.

99. In Kenya, a programme or project approach must be adopted to help alleviate problems

associated with the management of biodiversity data. The BDM plan for Kenya envisages a project for the implementation of the Kenya biodiversity information system, which is designed to take place in three phases, with a first phase of two years and second and third phases of three years each. The first phase of the project will focus on training, establishment of the implementation team, transfer of technology through technical consultancy and establishing the networking infrastructure required and making prototypes of the information system. In the second phase, the data application process will start. The process will include the drawing up of Kenya data standards and information exchange procedures or guidelines, and the collection of primary data to fill the information gaps. Information products will be developed and disseminated to users and decision makers. The capacities of the dataset custodians will be reviewed and some further training undertaken. In the third phase, data application and collection will continue, with emphasis on data collection and maintenance. Some of the project activities will run through the whole project period. Training has been identified as one of the most important tasks of this project.

100. The National Environment Secretariat will assume the functions of the information hub. Training will be carried out by national and international institutions, including non-governmental organizations and the private sector. The BDM plan implementation schedule runs from 1 July 1998 to 30 June 2006. A large proportion of the project funding will be solicited from donor agencies, either through soft loans or grants. A specific proposal will be developed and presented for funding in line with the requirements of GEF. Since the biodiversity data management is crucial to the implementation of the NBSAP, a request for funding will be made to the Global Support Programme. It is envisaged that the Government will contribute to provide funding. Equally important will be the need to explore the possibility of funding from the private sector. Other funding options include charging a fee for access to data already in an organized form and marketing the network outputs (publications and other materials) to targeted audiences. The proposed project is estimated to cost $7.4 million.

(h) *Papua New Guinea*

101. The goals of the Papua New Guinea BDM plan are the following: to promote the access of biological information both nationally and internationally; to promote the use of biodiversity data to generate information nationally; and to promote the use of biodiversity information in Papua New Guinea strategic planning for land-use and biodiversity conservation. The plan has five components, which aim to expand data holdings and build capacity in data management. These components are as follows: to establish the needed policy infrastructure for implementation; to establish a multi-sectoral steering committee for the implementation of the plan; to establish a coordinated biodiversity data network; to establish a data users group for technical training to become better custodians; and to support data capture and information production.

102. In addition each of the components identifies the implementing agency, resources available, resources required, possible sources of funding and stakeholders. The implementation time frame is not provided since the organizational structure of the Department of Environment and Conservation has not been approved, and it is not possible to assign tasks to various

individuals. Resources available are identified as biodiversity rapid assessment project (BioRAP) funds and potential funding is expected from the Department of Environment and Conservation. The budget has not been presented. The Department of Environment and Conservation will play the lead role in the plan's implementation.

(i) *Poland*

103. The amended version of the Polish BDM plan is dated 3 April 1998. To date, there has been no integrated system for biodiversity data collection, processing, updating and delivery of information functioning in Poland, nor has there been any comprehensive system for the exchange of information on the status and use of the country's biological resources, owing to the lack of information systems based on advanced technologies. The Polish BDM plan aims at establishing a national BDM programme.

104. The programme will assist in building a mechanism to support the flow and exchange of up-to-date information on biological diversity in Poland between all interested persons and institutions. Coordination of the programme will be entrusted to the national unit responsible for the implementation of the provisions of the Convention on Biological Diversity in Poland. The primary objective of the programme is to support the conservation of biodiversity and sustainable use of its components through the national systems of biodiversity information exchange. The specific objectives include: preliminary identification of information sources; identification of target audiences and scope of biodiversity information; definition of data formats to be applied for data collection and storage and information delivery; definition of information accessibility and management principles; facilitation of international cooperation in the scope of biodiversity data exchange; establishing education mechanisms promoting the use of biodiversity data; and implementation of the clearing-house mechanism in Poland.

105. The activities to be carried out within the national BDM programme are the following: identification of the general scope and types of the data for efficient conservation of biological diversity in Poland; analysis of network linkages between information and data providers and units responsible for programme implementation; establishing rules for information and data exchange between the stakeholders; determining the rules for database establishment and standardizing information exchange; initiating the work on thesauruses to facilitate information description and retrieval; identification of needs for equipment, human resources and training; establishing a timetable for the programme implementation and estimating costs; and establishing the principles of international cooperation in the field of biodiversity information exchange. The programme implementation timetable runs from 1996/1997 to 1999. Units responsible for implementation have been identified, including a multi-sectoral implementation team of representatives from the Ministries of Environmental Protection, Agriculture and Food Economy, Finance, Public Health, Transportation and Maritime Economy, Administration and Internal Affairs, National Defence and National Education and the State Committee for Scientific Research. The total budget is $695,000. Funding sources have not been included in the BDM plan.

(j) *Thailand*

106. Thailand's BDM action plan was prepared by the Office of Environmental Policy and Planning in May, 1997. The plan identifies tasks for the national institutions. The working group on data management under the national committee on the Convention on Biological Diversity has reviewed the plan and approved a grant for the plan's implementation. Certain parts of the BDM plan have been integrated into the instrument on national policies, measures and plans on the conservation and sustainable use of biodiversity, which was approved by the Cabinet on 15 July 1997. The Thai Government has agreed in principle to allocate funds to implement the BDM plan.

107. In total, the BDM plan comprises four policies, 15 measures and 51 specific activities. The majority of the activities have been assigned to the data transferring coordinator or the hub, a body established to operate the biodiversity information network. A considerable number of the activities fall under the data custodians. The four policies under the plan are: to promote biodiversity data management at the national level; to promote efficiency in biodiversity data management at the national level; to promote the development of biodiversity data management personnel; and to promote regional and international cooperation. Implementation of the plan will run from 1997 to 2002. The budget figures are not included in the plan.

5. *BDM workshops*

Several BDM workshops were held by each of the 10 participating countries. Selected topics addressed at the workshops included:

(a) Identification of information needs and information sources;

(b) Biodiversity data management;

(c) Undertaking the national institutional survey;

(d) Establishment and management of databases;

(e) Mechanisms of data flow and format of reports for decision makers;

(f) Alien species and data management;

(g) Preparation of BDM plans; and

(h) Importance of regional cooperation in biodiversity data exchange.

108. The workshops helped to ensure that the specific needs of the countries were addressed and that personnel from the many national institutions involved were fully briefed on the project. Countries were offered assistance in the planning and running of the workshops as well as training courses in data management. UNEP and WCMC provided technical assistance when requested. There is a major difference in results between those countries which took the offer of

assistance and those that did not. These workshops and training courses were very well attended and their contents were considered very useful. The training courses provided hands-on experience in BDM management, including practical applications using computers and the Internet.

109. The BDM workshops were effective in improving understanding of biodiversity data management as well as promoting the understanding of the project objectives and the process of project implementation. They constituted the best means of communicating with the stakeholders. They also served as a means of training and provided an open forum for discussions and for the sharing of experiences. The methodology used in running the workshops allowed open and intense debates on what the suppliers of biodiversity information understood and wanted for the support of biodiversity information management. This facilitated reaching agreements on the type, format and scope of the information to be exchanged. The workshops were seen as an opportunity for the introduction of the concept of biodiversity and the provisions of the Convention on Biological Diversity to the participants and for raising awareness on these issues. Kenya organized a journalists' workshop on BDM activities in an effort to increase public awareness on the activities and objectives of the BDM project. Following the workshop, articles on BDM activities appeared in the daily newspapers.

110. The computer training sessions conducted during the workshops were considered inadequate in that they did not leave the participants fully functional in electronic database management. Additional computer training for the personnel of the national institutions will be necessary if the equipment provided by the BDM project is to be used effectively. Ghana is planning an additional stakeholder workshop at the end of July 1998, to present and receive comments on the national BDM strategy and implementation plan. In addition, a donors' conference is planned for October 1998, in order to present the final project products to the donor community and to seek funding for the implementation of the BDM strategy and action plan.

6. *BDM newsletters*

111. The BDM umbrella project published and distributed five issues of the newsletter *BDM Update* during the course of the project. The last issue of the newsletter was published in September 1997. The newsletters charted the progress of the implementation of the project in each of the participating countries and provided information on issues and events relevant to the project implementation. A final issue of the newsletter for the pilot phase of the BDM project is to be published on completion of the project.

112. The newsletters helped to keep the BDM participating countries, the relevant national institutions and the BDM advisory cmmittee informed of the project's achievements. Some of the issues were incorporated in the UNEP publication *Earth Views*, which reports every four months on the assessment and information activities of UNEP and its partners. The newsletters also updated the readers on the progress achieved in drafting the BDM plans and guidelines, and reported on the outcome of workshops. They were widely distributed to members of national biodiversity units, workshop participants, universities and research institutions and were found to

be very effective in informing the readers on the overall implementation and progress of the BDM umbrella project.

113. Egypt published two newsletters for the BDM subproject, which included information about biodiversity data management and project activities. The newsletters developed linkages by generating awareness about biodiversity data management. They were distributed to all national institutions handling biodiversity data and to the libraries. In an effort to publicize BDM activities in Kenya, a newsletter and a brochure on BDM objectives were published in March 1997. These were widely circulated to participating national institutions, non-governmental organizations, journalists, libraries and universities. Costa Rica included *BDM Update* in its web site.

III. REALIZING PROJECT OBJECTIVES

114. This chapter assesses the success of the BDM project in realizing its objectives. In particular, it addresses the appropriateness of the project for the participating countries, the data management procedures and systems, and the capacity-building accomplished through its implementation. In addition, it describes the linkages built as a result of the project, the institutionalization of the project products, and the future replicability and sustainability of the project.

A. Appropriateness of the project *vis-à-vis* national requirements

115. The BDM project was very appropriate for the participating countries, as it came at the time when they were initiating the process of developing their NBSAPs, as called for by the Convention on Biological Diversity. NBSAPs require the availability of reliable and up to date biodiversity data and information. The BDM project provided an opportunity to document whatever information was available, where it was stored, how it was managed and, where possible, the conditions for its accessibility. The BDM project took the first steps towards the establishment of nation-wide biodiversity information networks. It provided the opportunity for participating countries to pull together all the stakeholder organizations to develop common procedures for the collection, processing, storage, management and exchange of biodiversity data.

116. In Costa Rica, in 1997, the United Nations Development Programme (UNDP) funded a project (managed by INBio) to carry out the country study, country report and national biodiversity strategy as mandated by the Convention on Biological Diversity. The team carrying out this project reported that the information gathered by the BDM project, as well as the level of awareness demonstrated by the collaborating institutions, made it easier to contact and retrieve part of the information required to complete these three tasks in Costa Rica.

117. The BDM project appears to have correctly identified a problem that needed to be addressed in China. The appropriateness of the BDM project to Papua New Guinea's requirements cannot be questioned. It provided the needed impetus and funding to implement many components of land-use planning for conservation and complemented the BioRAP conservation area site selection project. Having ratified the Convention on Biological Diversity, developing countries have an obligation to ensure the proper management of biodiversity data, as called for by various articles of the Convention. The BDM project has initiated the process of coordination between agencies holding biodiversity data, and highlighted the need for proper management of biodiversity data. Participating agencies found the project very useful, for example, in initiating dialogue regarding the use and sharing of data in Papua New Guinea. Of the participating countries, however, only Egypt reported mobilizing its data from the country study and placing it in the national biodiversity database.

B. Data management procedures and systems

118. The BDM project has provided the necessary vision and building blocks to enable the participating countries to move into the information age. The strategies developed call for a facilitated network architecture with ensured interoperability. The data hub will operate a metadatabase system, essentially to serve as a catalogue containing information describing the various datasets, including such attributes as theme, quality, origin, etc. The hub will also serve as the clearing-house mechanism for the exchange and dissemination of biodiversity data and information.

119. Many developing countries' institutions had ad hoc procedures and systems for the management of their data. The BDM project provided the opportunity for procedures and systems to be developed for the management of biodiversity data at the national level. The national agencies, while agreeing to provide information on the types of data they hold, for purposes of developing the metadatabase, have decided to retain custodianship of their own datasets.

120. The metadatabase will, therefore, provide the source of the datasets, but access and transfer responsibilities will rest with the individual agencies holding the data. The BDM project assisted in the setting up of metadatabases that describe the datasets of participating national institutions. In many cases, this was the first time in the participating countries that these datasets had been documented and placed in a metadatabase. This was a step forward in standardizing the documentation of datasets.

121. The guidelines and action plans provide well for administrative procedures for data management, covering such aspects as the clearing-house mechanism and the regulation of data access. Standard questionnaires to identify institutions relevant to biodiversity data management were developed. These questionnaires may be sent regularly to the institutions which possess data on biodiversity in order to update the information contained in the metadatabase. Simplified systems of biodiversity information and data flow were developed and presented in graphic form. Several basic procedures required for the efficient functioning of such systems were suggested. These suggestions are currently under discussion in the Ministry of Environmental Protection, Natural Resources and Forestry in Poland and will be included in the country's national BDM programme, a draft version of which was prepared by the Institute of Environmental Protection. Since information exchange was one of the main objectives of the BDM project, protocols or communication procedures are being prepared to ensure that all exchange units are compatible, i.e., that the different datasets have been documented in accordance with established standard procedures.

122. The BDM project developed structures and mechanisms for open information exchange to serve as national clearing-house mechanisms. The design included web pages with metadatabase systems containing information on the biodiversity databases available in the participating countries. Connections with the secretariat of the Convention on Biological Diversity will be made through the Internet. The design also included a connection with the GEF web page. This system type contributed to a larger information structure, the national

environmental information system (SINIA) in Chile. The BDM project became one of the proposed 22 modules of information to support SINIA (to date, there are only four modules, one of which is the BDM project). INBio in Costa Rica created a BDM home page available at http://www.inbio.ac.cr/~bdm/home.html.

123. In Egypt, one of the main achievements of the BDM project was the creation of a national biodiversity database at the national biodiversity unit to serve as a central unit for national information network. Procedures and systems were developed for the database, based on national information requirements. The low level of expertise in biodiversity data management hampered database and network establishment. The WCMC guidelines were considered too lengthy and complicated to be used as an effective information management tool. Furthermore, the software supplied to the project, the facilities of the UNEP Global Resource Information Database (GRID) and the electronic resource survey produced by WCMC were also not fully utilized because of technical difficulties encountered in their use and application. Further training was needed for the national biodiversity unit personnel in all aspects of data management.

C. Capacity-building and skills development

124. The development of national BDM capacity and skills is considered an outstanding achievement of the BDM project. The primary beneficiaries were the national biodiversity units and the national focal institutions. At the national level, BDM capacities and skills were enhanced through the workshops and training courses, which were among the most successful activities of the project. The lack of qualified in-country experts in biodiversity data management (i.e., trainers) hampered capacity-building and the development of skills.

125. Capacity and skills to collate, store, retrieve, manage and use biodiversity data were acquired from the BDM induction course and from national training workshops. The areas of biodiversity data management which have been enhanced include: database and metadatabase creation; use of computer hardware and software; introduction to information technology; use of the Internet; creation of web pages and home pages; and information network establishment and operation.

126. It was only under the BDM project that many management officials became aware for the first time that they dealt with and possessed biodiversity data. The BDM project has been important for the development of skills not only of the members of the project team, but also for persons involved in the management of biodiversity data at various levels of the government administration. Although not directly funded by the BDM project, the series of checklists of biodiversity in Thailand recently produced by that country's Office of Environmental Policy and Planning provide evidence that activities outside the BDM project have been stimulated through the Office's participation in the project. The BDM plans make provision for further capacity-building in the future. Data handling capacity was increased in many institutions, especially those that benefited from BDM funds to purchase new equipment. The national capacities to collect, manage, use and disseminate data on biodiversity as a result of the BDM project have increased with the availability of several biodiversity information tools developed and included in the web pages.

127. Thus, in Ghana, personnel received training in the practical application of information technology in biodiversity settings at the Remote Sensing Applications Unit of the University of Ghana. This process can be considered as having just started and will require additional support. The capacity in the use of computers for biodiversity data management in the focal institution needs to be improved.

128. In the Bahamas, many more people within the participating agencies use the Internet as an important information source. In Papua New Guinea, the BDM project provided an introduction to the information technology which, through intensive training and longer exposure periods, could lead to meaningful learning and skills transfer. In Egypt, training courses in the design and use of biodiversity databases were conducted at Ain Shams University and the University of Cairo Computer Laboratory.

129. It appears that no training needs assessment of the participating countries was carried out prior to the commencement of the project. The training offered was that which each country requested. The countries were at different levels in terms of capacity in information technology. Not all those who participated in the BDM course were effective in transferring what they had learnt. A train-the-trainers course right at the onset of the project could have addressed the critical skills and gaps now apparent in different countries. In addition, the situation was not helped by the defection, mid-way through the project, of persons who had already been trained.

130. There is a convincing argument in favour of training a critical mass of people to implement the BDM project in each country. There is also considerable merit in strengthening local institutions such as relevant university departments or such bodies as INBio or the Remote Sensing Applications Unit to offer this type of training. This would create a nucleus of knowledgeable people to offer training locally. The BDM plans should consider this a top priority action.

D. Linkages with national, regional, and global networks

131. Linkages with national networks were mainly developed in the initial phase of the project

during workshops and training courses. These were important forums, at which national organizations could meet and exchange information and ideas on biodiversity data management.

1. *Kenya*

132. At the personal level, the stakeholders in Kenya established their networks and identified the National Environment Secretariat as the hub. With the implementation of the BDM plan, all the stakeholders will feed information to the hub, which will in turn disseminate the information to the stakeholder institutions.

2. *Chile*

133. In Chile, web page connections were established with the Costa Rica web page and with the clearing-house mechanism of the Convention on Biological Diversity. It is hoped that it will now be possible to commence the repatriation of information. As the BDM project is a component of SINIA, the national environmental information system, under coordination by CONAMA as the main node of the network, communication with other public and private sector organizations with biodiversity information will be facilitated. It is important to note that only Chile, Costa Rica and Poland, among the participating countries, were able to establish clearing-house mechanisms.

3. *Poland*

134. Information on various aspects of biodiversity data management in Poland is already available through the Internet on the home page for the Convention on Biological Diversity in Poland, established by the Institute of Environmental Protection.

135. To date, however, no formal linkages with national, regional, and global networks relevant to biodiversity data and information management and exchange have been created. Establishing these links has been identified as an important task on which the BDM project should follow up. Currently, a formal link is being developed between the Institute of Environmental Protection metadatabase and the national parks headquarters in Warsaw. In addition, an agreement was signed between the Ministry of Agriculture of the Netherlands and the Ministry of Environmental Protection, Natural Resources and Forestry of Poland, to establish an institutional link between the Polish and Dutch clearing-house mechanism home pages.

4. *Thailand*

136. One of the four policies of the Thailand BDM plan is to promote regional and international cooperation. Once this is translated into programmes and projects, linkages will be established with regional and international networks, including the Regional Centre on Biodiversity Conservation of the Association of South-East Asian Nations (ASEAN) and the clearing-house mechanism of the Convention on Biological Diversity. Linkages with national networks are still being developed.

5. *Ghana*

137. Under its BDM subproject, Ghana organized the West African regional workshop on biodiversity information management, held from 29 September to 3 October 1997 in Accra. A representative of the BDM subproject made a presentation on the BDM project. Another emerging regional network is the Gulf of Guinea large marine ecosystems project. Ghana would like to introduce its data management guidelines to the large marine ecosystems project, for possible adoption as the guidelines for the regional initiative. If this occurs, then the BDM subproject will have been instrumental in setting the biodiversity data standards for the entire coast of West Africa from Senegal to Angola.

6. *Bahamas*

138. In the Bahamas, no regional linkages were established by this project. The project did not develop global linkages beyond learning to access and use the Internet for specific searches. The only global links created thus far have been between the Bahamas, UNEP and WCMC.

7. *Evaluation findings*

139. The BDM project created a greater awareness of the wide variety of databases, manual and computerized, already existing in the participating countries, and the accessibility of data-sharing between organizations, particularly government bodies and, research and university institutions. This awareness has resulted in a dramatic increase in requests for access to data between these entities. Once implemented, the data management guidelines and action plans will create national BDM networks linking the new data centres with existing databases in these countries.

140. In view of the foregoing, this evaluation found little evidence of linkages with regional agencies that had resulted from the BDM project. The BDM project developed strong inter-agency national linkages but very few regional and global linkages. At the global level, the advantages of a global umbrella project were not fully exploited during the implementation of the BDM project. Linkages were formed between focal national institutions, national biodiversity units, UNEP and WCMC networks, through information exchange, workshops, meetings and activities related to the project management. Many linkages could have been established with other global networks, especially through the active participation of the the advisory committee, which has representatives from organizations such as the Environmental Resources Information Network (ENRIN), Conservation International, Birdlife International, The Nature Conservancy (TNC), the Canadian Biodiversity Informatics Consortium (CBIC), the Expert Centre for Taxonomic Identification (ETI), and the Centre for Agriculture and Biosciences International (CABI). The umbrella project advisory committee could have provided better global linkages, in view of its members' involvement with global biodiversity information networks. The committee should have been enabled to play a more active role with funding for its members to participate in national and regional workshops. In the project design, no budget line was allocated for the active participation of the advisory committee.

141. None of the participating countries reported linkages with the UNEP environmental information networking (EIN) unit's metadata directory. The BDM project should have promoted regional and global linkages. These are essential for the success of the project and for biodiversity data management.

E. Institutionalization of the project products

142. The level of institutionalization of the project products in the participating countries varies widely. Many procedures and practices on data management were adopted by individual agencies, but considerable work remains to be done on setting national standards for data collection, organization and exchange. In Poland, systems and procedures of biodiversity information and data flow, the network structure and linkages of the clearing-house mechanism in Poland were worked out and submitted to the Ministry of Environmental Protection, Natural Resources and Forestry, which is responsible for biodiversity management and conservation in the country. These procedures have been incorporated in the national BDM programme, which is being reviewed by the Ministry of Environmental Protection, Natural Resources and Forestry. Perhaps the most useful product developed as a result of the BDM project is the home page for the Convention on Biological Diversity in Poland. This metadatabase contains very useful sub-databases on: institutions working in biodiversity management in Poland; protected areas in Poland; ELADA (the electronic atlas of Agenda 21); and the clearing-house mechanism.

143. In Egypt, one significant achievement of the subproject was the institutionalization of the national biodiversity database within the structure of the nature conservation section of the Egyptian Environmental Affairs Agency, the national governmental body responsible for environment and biodiversity conservation. This took place as a direct result of the BDM subproject and the location of the national biodiversity unit at the Egyptian Environmental Affairs Agency. The national biodiversity database will be incorporated into the department responsible for information systems and GIS management.

144. In Thailand, the main subproject products, namely, Thailand's BDM action plan, the national institutional survey and the national guidelines on data management, are unpublished manuscripts held by the Office of Environmental Policy and Planning (OEPP) in the country. Some aspects of the guidelines and action plans have been integrated into the instrument on national policies, measures and plans on the conservation and sustainable utilization of biodiversity. This document has been published in Thai and has been distributed to almost every relevant institution and library in the country.

145. In Papua New Guinea, the Resources Inventory Branch was renamed the Biodiversity Assessment Branch as a result of the BDM project. The change of name was seen as a true reflection of the role of the Branch, which had assumed all responsibilities for the management of biodiversity data.

146. In Costa Rica, the datasets were characterized for each institution and published on the web site. This was the first time that all institutions which participated in the subject were able to ascertain who was doing what and the location of the majority of datasets existing in the

country.

147. Chile completed the four products, namely, the national institutional survey, the national resources inventory, data management guidelines and a plan of action, as indicated in the subproject agreement. In addition, five other products were completed, namely: the establishment of the BDM web page (http://www.conama.cl/bdm) as part of the Chilean environmental information system (SINIA); the establishment of a searchable metadatabase; the establishment of a bibliographic database; the establishment of a national clearing-house mechanism pilot phase, as agreed at the first, second and third meetings of the Conference of Parties to the Convention on Biological Diversity; and support to CONAMA in organizing the workshop on the species conservation categories as part of the environmental impact assessment system and the workshop on intellectual property and access to genetic resources, security and safe handling of biotechnology.

148. In some countries, the institutionalization of the project products has not been achieved. In order to ensure the institutionalization of the BDM products, it is important to integrate biodiversity data management with government activities and to relate the BDM project to national mandates, such as NBSAPs. It is also important to integrate the BDM project with regional activities and to focus on products and other deliverables. For example, in Costa Rica, the national biodiversity strategy process, the country study and the first national report to the Convention on Biological Diversity have benefited from the information generated by the BDM project. In Chile, biodiversity data management is one of the 22 modules of SINIA. In China, the BDM project led to the establishment of the National Centre for Biodiversity Information. In Papua New Guinea, the BDM project facilitated the implementation of the World Bank/Australian Agency for International Development (AusAID)/GEF pilot BioRAP project.

F. Replicability and sustainability

149. The BDM project is highly replicable, as is evident from the results of the 10 participating countries. The data collection, processing and management will continue as normal activities at the individual station, department and institutional levels. The BDM project will make the task of organizing and managing the databases more efficient. In all the participating countries, continuation of the BDM project is planned. Much of the actual data collection, storage and management has been incorporated into the routine work of custodian institutions and the costs absorbed into the budgets of those institutions. There will be a need, however, to establish adequate budgets for the purchase of computer equipment, since in many institutions only small amounts of data have been computerized, owing to lack of equipment. The continuity of the BDM project will also be ensured through the updating and improvement of products such as the BDM web pages, metadatabases and the action plans.

150. Implementation of some portions of the BDM plan has already begun, with funding from other parallel projects. Projects such as the Chinese biodiversity information system within the Chinese Academy of Sciences and the nature reserve and biodiversity information sources sharing project within the State Environmental Protection Administration (SEPA) provide a way of achieving the BDM plan's objectives.

151. In Poland the subproject team is now working on a new project which will be submitted to UNEP/GEF for possible funding. In addition, funding possibilities within Poland are being explored. Even without additional funds, an update of the institutional survey and inventory of national resources in Poland will be carried out in May or June 1998.

152. Ghana has planned a donors' conference for October 1998 in order to present the final project outputs to the donor community and seek funding for implementation of the BDM strategy and action plan. In the Bahamas, the BDM subproject steering committee has done a good job in identifying capacity gaps and needs. An individual or agency needs to be identified to take a lead role both in continuing the communication between agencies and in identifying the new funding sources to address the capacity-building needs.

153. The Government of Thailand has agreed in principle to provide funds to implement the BDM plan, including funds for the establishment of the biodiversity information network, but the future sustainability of the BDM project in Thailand is now in question owing to lack of funding as a result of the economic downturn in the region. The Government has released funds for implementation of the BDM recommendations, however, although the precise purpose for which the money will be used has yet to be determined.

154. No other funding sources for the continuation of the BDM subproject in Egypt have as yet been identified, although some action has been taken to raise donor support by including a national programme for biodiversity data management in both the national biodiversity strategy and the national environment strategy.

155. In Kenya, it is hoped that, through government budget allocations, some funds will be made available to sustain the BDM process. Institutions are also expected to provide funds to sustain their own database units. Currently, the Government is going through a serious economic crisis and it will be necessary for funding from donors to be made available so that the results of this pilot phase process do not stall. To ensure continuity of this project, it will be important to seek funding from GEF, through UNEP, which will be supplemented with government funds that may be available.

156. In the course of the project implementation, there has been a growing realization that the BDM system could generate a sustainable source of revenue through the commercialization of the BDM products and outputs. This potential source of funding needs to be explored further, especially the commercialization of biodiversity data. The sustainability of the BDM subprojects ought to have been a permanent focus for action from the very outset and throughout the course of project implementation. It is not advisable to rely on the provision of more funds from the same donor at the end of the project. UNEP and GEF are unlikely to support a process that does not ensure its sustainability, as this would constitute a serious waste of resources.

157. The project documents and the discussions during the preparatory stages of the project failed to indicate to UNEP and GEF the importance of sustainability for the BDM project. Consequently, sustainability was not built into the BDM project, although the participating countries were requested to identify sources of funding for implementing the BDM plans. The BDM project is not fully sustainable without further donor funding. A number of activities would continue, such as database maintenance and updating, although at a slow pace, but the biodiversity information network would not be well established without additional support.

158. Further support is required to the BDM project in the participating countries, to maintain the momentum and to allow countries to work out mechanisms to sustain the project. UNEP and GEF should support similar activities with a new group of countries. Consideration should be given to countries close to those which have already carried out the project, in order to initiate the component of regional linkages and collaboration. For example, the Central American Commission on Environment and Development (CCAD) is aiming at developing BDM-like projects in Central America. INBio and the BDM network in Costa Rica could provide South-South collaboration. In addition, the InterAmerican Biodiversity Information Network (IABIN) would benefit from the Chilean and Costa Rican experience, especially with respect to training workshops. The lessons learned in the pilot phase should be taken seriously in designing the new projects.

159. Article 20 of the Convention on Biological Diversity requires Contracting Parties to provide, within their capabilities, financial resources in respect of those national activities which are intended to achieve the objectives of the Convention. BDM activities fall precisely into this category and options for continued financing of BDM activities should be more vigorously explored within the participating countries and others intending to implement BDM-type activities. The internal sources are the government agency budget allocations or special appropriations. Funding support can also be acquired with well thought-out fundraising initiatives. Other mechanisms of funding for BDM activities that could be explored include national environmental funds, user fees and added commercial value. The first task to be carried out before raising new financial funding should be a thorough examination of how the existing biodiversity conservation funds are being used and whether they could be spent more wisely, more cost-effectively, or on higher priority areas.

IV. ROLE AND EFFECTIVENESS OF UNEP

160. This chapter assesses the role and effectiveness of UNEP during the implementation of the BDM project. Specifically, this section examines the role played by UNEP in the provision of technical assistance, and in the coordination and administration of the umbrella project, as well as its success in building partnerships with local entities.

A. Provision of technical assistance and expertise

161. UNEP linked the BDM project to WCMC, which provided technical support in the initial phase of project implementation. The technical expertise mobilized for the workshop was considered very good. WCMC and UNEP assisted in the running and organization of BDM workshops, as well as training courses. Representatives of UNEP and WCMC also made presentations at these meetings.

162. Overall, the materials provided by UNEP and WCMC were very helpful. It appears, however that, outside the workshops, there was little contact with UNEP. In the Bahamas, the steering committee members wished to have direct contact with UNEP and WCMC, to ask questions as issues arose both during meetings and during the compilation of the national institutional survey report. This was not possible, since no such communication links were established in the design of the project. Most of the communication, outside workshops, was between the subproject coordinator and the umbrella project task manager.

163. The major functions of UNEP were viewed as administering funds and monitoring the subprojects. UNEP clearly played an important role in sparking interest in the field of biodiversity data management. During the course of the project, UNEP was very supportive in technical aspects and was particularly good in providing materials such as the Global Biodiversity Assessment. UNEP was also sympathetic and understanding, in particular, at times when the project was bogged down by government bureaucracy.

164. It would have greatly benefited the subproject in Egypt if a BDM expert from WCMC or UNEP had visited Egypt on a periodic basis to provide technical advice on the development of the project products, such as the national institutional survey, the BDM plan, and the national biodiversity unit database, as well as to take part in the in-country workshops and training programmes. A similar concern regarding the need for periodic visits to subprojects as part of ongoing monitoring was raised by Ghana. UNEP did not have adequate capacity and staff to provide the required technical support and field visits. One task manager was not sufficient to cope effectively with a project of this nature. A team of at least three persons should have been established at the beginning of the project.

B. Building partnerships with local entities

165. There was no partnership built between UNEP and other local entities. The building of such partnerships does not seem to have been a focus of the project, nor was it perceived as significant to achievement of the project objectives. UNEP promoted the building of partnerships between the focal national institutions and the other participating local entities. A strong partnership was built between UNEP and the project focal institutions throughout the implementation of the project. Strong partnerships were also developed between the focal national institutions and other participating local entities.

166. One obvious partnership which UNEP could have fostered during the implementation of the project in Ghana would have been to involve the United Nations University's Institute for Natural Resources in Africa (INRA), located on the University of Ghana campus. With the Institute's mandate, biodiversity focus and priority which it accords to the provision of endogenous consultancy capacity, such a partnership could have been extremely useful. Ghana would still benefit if such a link were forged. UNEP needs to be proactive in promoting such links.

167. In Kenya, all the stakeholders attending BDM meetings and workshops gained insights into the activities of UNEP thanks to the presence of UNEP at these meetings. It is important to note, however, that this was made possible by to the proximity of UNEP to the focal national institution in Nairobi. Monitoring systems developed to track project implementation at the umbrella project level and at the national level were inadequate. The project could have benefited from a mid-term evaluation meeting of the project implementers, which would have facilitated the sharing of experiences and have allowed adjustments to be made to the ongoing project.

C. Biodiversity data management and the role of UNEP in GEF

168. The role of UNEP in GEF is spelled out in the Instrument for the Restructured Global Environment Facility, which, in summary, calls for UNEP:

(a) To play the primary role of catalysing the development of scientific and technical analysis and in advancing environmental management in GEF-funded activities;

(b) To provide guidance on relating the GEF-financed activities to global, regional and national environmental assessments, policy frameworks and plans, and to international environmental agreements; and

(c) To establish and support the Scientific and Technical Advisory Panel (STAP) as an advisory body to GEF.

169. The BDM project complements three other global projects related to the conservation and sustainable use of biodiversity implemented by UNEP and financed by GEF. These projects are:

(a) Support to the preparation of biodiversity country studies, phases I and II. This project was designed to gather information on: the status and trends of a nation's species, genetic materials, habitats and ecosystems; the status of current practices for conservation and use of biological diversity; and the monetary and non-monetary costs and benefits involved. The project is aimed at providing the essential background for the sound formulation of NBSAPs;

(b) The Global Biodiversity Assessment. The objective of the global biodiversity assessment project was to provide an independent, critical, and peer-reviewed scientific analysis of the current issues, theories and views regarding the origins, dynamics, assessment, measurement, monitoring, economic valuation, conservation and sustainable use of biological diversity and to identify critical issues where there is consensus or continuing debate among scientists; and

(c) NBSAPs, and first national reports to the Convention on Biological Diversity. This project was initiated to assist countries to implement Article 6 of the Convention, which calls on Parties to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity. Under this project, countries are also assisted to prepare their national reports as stipulated in Article 26 of the Convention. The first national reports focus on measures taken to implement Article 6 of the Convention on Biological Diversity.

V. LESSONS LEARNED FROM THE PROJECT

170. This section of the report outlines the lessons learned from the implementation of the BDM project. Specific lessons emerge about the project design, project activities and project coordination. In addition, this section presents an overall assessment of the project.

A. Lessons learned

1. *Design*

171. The project was very timely and well-suited to the developing countries. The goals and activities were appropriate but the duration was too short for many countries, which had to rely on limited in-country technical expertise. The BDM project, therefore, had to be revised severally to accommodate delays which the countries encountered in the overall implementation of the project at the national level. The countries did not have any input at the concept and design stages. The duration of the project seems to have been arbitrarily decided. This is an important lesson from the pilot phase. There were difficulties encountered in the implementation of the project in some countries, such as Ghana and Egypt, since the project design called for a high degree of technical competency in the rapidly evolving field of environmental information systems (EIS).

172. The project design called for UNDP to act in some countries on behalf of UNEP in administrative matters relating to the project. In some areas, the UNEP/UNDP relationship did not work well as hoped: this was the case, for example, with the BDM subproject in Ghana. It would have been appropriate for UNEP to undertake one or two short-term missions to monitor the progress of the project. Representatives of the UNDP offices identified to act on behalf of UNEP ought to have attended the consultative workshop and the meetings of the advisory committee in order to gain a full understanding of the project's requirements. This would have considerably improved project performance.

173. The project was based upon a number of critical assumptions and should have given due consideration to the existing state of biodiversity conservation and technical capacities of developing countries, as well as the in-country work environment. The capacity of each participating country should have been assessed as a pre-project activity and the project design should have accommodated this aspect.

174. The strategic location of the project focal point at a central government body with a high-level mandate allowed the project to form partnerships with key national stakeholders and gave it access to a wide range of resources and audiences.

175. Implementation of the BDM plans will require large amounts of funding that are not currently available in the participating countries.

2. *Implementation*

176. Some of the countries (Chile, China, Costa Rica, Egypt and Poland) were more successful in implementing the project activities than others (Bahamas, Ghana, Kenya, Papua New Guinea and Thailand). There are numerous factors that contributed to the success of project implementation. The key factors included broad political support and commitment, good telecommunication facilities, access to advanced information technology, existing in-country expertise and good project management capacity. The BDM project should have taken into account such country differences and have analysed the factors explaining such differences. Pre-project surveys are important in order to assess the country needs and to determine where to place more emphasis.

177. The lack of a full-time project coordinator at the country level was a problem in focusing the project and keeping the activities on track. Most of the national coordinators had other commitments which resulted in project implementation delays. In future projects, it is recommended that a full-time project coordinator is identified at the country level. The project coordinator should then be relieved of all other national commitments in order to concentrate on the project implementation.

178. Implementation of the project at the national level in two of the participating countries lost momentum with the resignation of the project coordinators. Increased participation at the BDM induction course from the participating countries is important to ensure so that the vacuum left by the resignation of project coordinators is filled immediately, to maintain the project's implementation momentum.

179. Where the project steering committees had broad representation and met regularly, there were few problems in project implementation. The steering committee in Ghana was established too late and met only twice in the course of the project. This was due to the misconception that, without the results from the national institutional survey, there was little work for the committee to accomplish. Project steering committees are essential and should be established right at the inception of the projects.

180. Participation by a wider range of stakeholders, especially information suppliers and users, was needed in all phases of project planning and implementation. It enhanced project implementation. This participation led to the sharing of experiences among the stakeholders and made it easier to reach consensus.

181. Use of local consultants in implementing the project enhanced its acceptability among the stakeholders. The lesson here is that the use of local expertise not only ensures project acceptability but also enhances project implementation.

182. In the carrying out of the national institutional survey the project team had to stimulate the replies to questionnaires through personal contacts, visits to institutions and even telephone conversations. Frequently, the team responded to doubts and questions from the institutions surveyed by phone, fax and e-mail. Regular contacts, communication, meetings, participation and consultation with stakeholders are fundamental to maintaining interest in a network.

183. Initially, the main concern of the information suppliers related to the intellectual property rights and the market value of biodiversity information. These concerns were dispelled when it was explained how the information was to be used, for example, the metadatabase system would be built to operate in a decentralized and open form. Institutional agreements would be negotiated to determine what information to exchange and how and, if a value existed for the information, the supplier would charge for it. The details of how the royalties would be paid have yet to be worked out. The issue of intellectual property rights needs to be addressed in the BDM plans.

184. The computer training undertaken in some of the participating countries has been insufficient, in terms both of its level and content, for the needs of the data management staff at the data centres. Much more training is required to enable them to operate as data processors and managers.

185. Several important institutions that manage biodiversity information did not participate in the BDM project, because of lack of personal or institutional interest and lack of credibility *vis-à-vis* large projects financed by international organizations, mainly because there are many cases of projects failing through insufficient follow up once the funding had been used up. In future projects, visits to such institutions should be made not only to administer the national institutional survey questionnaires, but also to explain the nature of the BDM project. Emphasis here will need to be placed on the benefits accruing to the institution as a result of being part of the biodiversity information network.

186. The documents produced by the BDM project were detailed and very useful. They should, however, be synthesized and a single document produced that will be easy to handle, especially by the decision makers.

187. The selection of the BEST Commission as the implementing agency for the Bahamas was possibly unwise where follow-up and sustainability of the BDM project are concerned, since BEST has no technical staff or legislative mandate to handle in-country data collection and management. The employment of foreign consultants in the middle of the project resulted in the production of separate Bahamian and non-Bahamian products. In-country consultants should have been sourced or trained to ensure the production of materials suited to the circumstances of the Bahamas.

3. *National capacities and role of beneficiary countries*

188. The participating countries' capacities in biodiversity data management are limited, given the newness of the field of biodiversity data management. Egypt needs assistance to develop human resources, systems and procedures for the efficient management and application of data and information, as well as to establish the necessary networks for information exchange, so that it can take part in the global information network.

189. In the case of those countries where the national capacity in BDM was low, it would have been more effective if the project had focused primarily on capacity-building and skills development, through more training sessions and workshops.

190. As a result of the project, BDM programmes have been identified as national priorities for the participating countries and are considered as complementary to the preparation of NBSAPs, as called for by the Convention on Biological Diversity.

191. Lack of government policies on information exchange meant that it was not possible to establish formal linkages at the institutional level, on local, regional or global scales. It was also not possible for the project to be linked to the Internet in Kenya.

192. Project staff in the focal national institutions in Kenya and Costa Rica were lost to the project through resignation. In Ghana, the project coordinator, at the end of 1996, had the responsibility of managing 16 ongoing projects and eight additional projects were in the pipeline. The result was poor project coordination on the part of the project coordinator. Participating countries should provide the necessary incentives to retain trained personnel. It is also important to designate the project coordinators as full-time BDM project managers with no added responsibilities, to ensure timely project implementation.

193. In some countries, the institutionalization of the project products has not been achieved. In order to ensure the institutionalization of the BDM products, it is important to integrate BDM with government activities and to relate the BDM project to national mandates, e.g., NBSAPs. It is also important to integrate the BDM project with regional activities and to focus on products and other deliverables. For example, in Costa Rica, the national biodiversity strategy process, the country study and the first national report to the Convention on Biological Diversity have all benefited from the information generated by the BDM project. In Chile, biodiversity data management is one of the 22 modules of SINIA, the country's environmental information system. In China, the BDM project led to the establishment of the National Centre for Biodiversity Information. In Papua New Guinea, the BDM project facilitated the implementation of the World Bank/AusAID/GEF pilot BioRAP project.

B. Overall assessment

194. On the whole, the BDM project has achieved its major goals. It has made a positive contribution towards improving biodiversity data management at the national biodiversity units, focal national institutions and all other participating institutions. It has raised the awareness of biodiversity issues at the workshops. Furthermore, the guidelines and action plans have influenced national policies on biodiversity and provided a framework for continued improvements in biodiversity data management in the future.

195. All the products generated by the project have been of great utility, either for the design of the biodiversity information systems or for their further strengthening. Among these are four products obtained from the BDM project: the national institutional survey report; the national resource inventory; the guidelines for biodiversity information management; and the action plan. Other products are the metadatabase and the web pages.

196. Since some of the project components have not been completed, the lessons learned remain to be disseminated as widely as possible. The BDM project has, however, provided the opportunity for the countries to pull together all the stakeholder organizations and to increase awareness about the importance of efficient data management. The lessons to be learned from the non-completion of these projects include the importance of ensuring sufficient inputs into the project design, and adequate capacity, monitoring, and supervision at the umbrella project level and at the country level.

197. The project was, however, a catalyst in generating interest in the emerging issues of biodiversity data management and mobilizing available national expertise in this field. More awareness-raising and publicity about biodiversity data management and the BDM project were needed to facilitate networking and fund raising efforts. There was also a need to give more acknowledgement of GEF to increase the visibility of this organization.

198. The local stakeholders identified the BDM workshops as very important activities. They clarified biodiversity concepts and allowed the stakeholders to meet other persons working in the same area. In the process they forged new personal and institutional relationships.

VI. EMERGING ISSUES

199. This section of the report outlines the emerging issues arising from the implementation of the BDM project. Specifically, it addresses the issues of capacity-building, implementation of BDM plans, private sector participation, project completion, publication of the products, the clearing-house mechanism and the role of steering committees.

A. Capacity-building

200. There is serious lack of existing national capacity in the area of biodiversity data and information management in the developing countries. Human resource needs were identified in the areas of analysis, computer programming and support, GIS technology, use of the Internet, the creation of web pages, project management, project monitoring and evaluation and public relations.

201. Considerable education and training effort is required, especially for government agency officials. Many government officials involved in biodiversity conservation are not even aware that they deal with biodiversity data and information. There are currently only weak links between the scientists and systems engineers. There is a general lack of qualified personnel who are trained in both disciplinary knowledge and computer technology. Training in computer use and biodiversity information management systems and in the use of the Internet have been identified as important.

202. The shortage of trained information technology personnel in the developing countries means that the skilled individual frequently leaves the institution which trained him or her to join the private sector, attracted by higher salary and benefits. If the BDM networks are to function at optimum efficiency in developing countries, then they will require further assistance including access to information technology hardware and software, technical expertise, advanced training for operating staff and dissemination of data. There is a need to retain trained personnel within the institutions where their skills have been improved.

203. It is hoped that during the implementation of the BDM plans, capacities of dataset custodians would be reviewed and further training conducted where necessary. There is a lack of capacity for project management and leadership. This is an area that should have been addressed, and perhaps workshops should have been conducted on project management.

B. Implementation of BDM plans

204. There is a general agreement that it is essential to implement a second phase of the BDM project, to make improvements on what has already been done and, at the same time, to expand the impact at national, regional and global levels. The implementation of BDM plans and the promotion of data exchange between institutions is essential. This could be linked to the efforts under way to prepare NBSAPs. The BDM activities could be complementary to those of NBSAPs.

205. All the participating countries have prepared BDM plans but those that have been submitted require review and adjustments. A number of the BDM plans do not address the issue of funding sources. Others do not contain implementation schedules and budgets. The BDM plans need to be revisited by the project, to ensure that they are completed and that they are implementable.

206. The BDM plans do not address the issue of regional and international linkages adequately. Given the number of institutions worldwide holding biodiversity information for the developing countries, a convincing argument can be built for strong regional and international coordination of biodiversity endeavours.

C. Private sector participation

207. With the exception of a few of the participating countries, the private sector was not involved in the BDM process. In its Article 10 (e), the Convention on Biological Diversity calls for cooperation between government authorities and the private sector in developing methods for sustainable uses of biological diversity. There are many private firms and organizations that generate and store biodiversity data, and their involvement in the BDM process is important. More stakeholder representation was needed in the national institutional survey, in particular planners, media, non-governmental organizations, consulting firms, and other private sector organizations for an accurate assessment of national biodiversity needs and requirements.

208. The BDM project offered tremendous opportunities for the focal institution to forge links with the private sector. For example, in Ghana, it is worth noting the failure to enlist the involvement of Geographic Information Services Limited (GISL), the leading private consulting firm in biodiversity information management solutions in Ghana. Some of the project management responsibilities could have been contracted out to reputable non-governmental organizations and private sector companies.

D. Completion of project outputs

209. At the time of this evaluation there are a number of countries that have not completed their project outputs. These include: Ghana, whose BDM workshops are 50% complete; BDM plan, 60% complete; information management guidelines, 40% complete; national resource inventory, 10% complete; and information technology equipment provision, 80% complete; Thailand, whose national resource inventory is incomplete; and the Bahamas, whose metadatabase and national resource inventory are incomplete. These figures are quoted from the local consultants' reports.

210. The fact that a number of countries have not completed the project outputs suggests a need for the project to be revisited. Participating countries should be encouraged to monitor project activities closely, and if implementation is falling behind schedule, to let the task manager know. The countries should give assurances that they will stick to agreed new deadlines.

211. The issue of non-completion of project outputs is related to project design, lack of capacity

and inadequate monitoring and supervision. These aspects of the BDM project should be reviewed. A mechanism should be put in place to ensure that the project outputs are eventually completed and disseminated to all the stakeholders.

E. Publication of products

212. BDM project products should be published and disseminated as widely as possible within the participating countries and, if possible, within the respective regions. They will be especially valuable to researchers and data managers seeking data sources and collaboration within the countries, the region and the world at large.

213. Publication of the products of the BDM project and their wide dissemination will have a major impact on the networking of biodiversity data managers and data sources, as well as increasing the accessibility of a host of other data management resources globally. There should be a firm intention to publish the outputs of the project, and to make them publicly available. The timely dissemination of the products will justify participation by the national agencies by demonstrating the progress of the BDM project. Costa Rica approached this issue successfully, by setting up a web site early on in the development of the project.

F. Clearing-house mechanisms

214. Formal systems of information flow and exchange to promote and facilitate scientific and technical cooperation, or clearing-house mechanisms, should be established and the obligations of governmental agencies defined to ensure the participation of relevant sources of information. The BDM project could be used as a model for the national development of the clearing-house mechanisms. The processes of consultations, national institutional survey, formulation of best practices and strategic planning could be packaged to help countries develop national clearing-house mechanisms. The expected results of the BDM project correspond directly to the benefits expected from clearing-house mechanisms.

215. These benefits are:

(a) To provide data for decision making;

(b) To support access to existing knowledge;

(c) To promote technical and scientific cooperation;

(d) To allow comparisons among existing data;

(e) To generate new information;

(f) To support a more effective implementation of the Convention on Biological Diversity; and

(g) To function at both national and international levels.

G. Role of steering committees

216. A high-level, multisectoral steering committee representing the interests of the major stakeholders should be established at the inception of the project. The role of the steering committee is important, as it brings leadership and authority to the project. Its roles should be clearly defined to include policy decisions, the facilitation of good working relations and working practices between the stakeholders and the formation of technical task forces to fulfil agreed biodiversity information goals. The steering committee provides an essential and influential front to the project activities.

217. Several steering committee members commented on the amount of work that this project required. Although personnel time was provided as a matching contribution in the funding of the BDM project, the committee members did not have their responsibilities removed from their jobs. Many committee meetings were held on weekends, and in the evenings. The steering committees were very dedicated and focused on these project activities, but felt unfairly compensated for these efforts. The efforts of the steering committee should be recognized and duly compensated.

H. Regional and global linkages

218. While national assessments and profiles of biodiversity can help address priorities and needs within a country, regional and global assessments can help place those priorities in a wider context. The BDM project did not actively promote the establishment of regional and global linkages. Kenya made an effort to link the project with the East Africa Biodiversity Network. Poland established an institutional link between the Polish and Netherlands clearing-house mechanism home pages. As noted above, global linkages could have been established with the active participation of the BDM advisory committee members.

VII. RECOMMENDATIONS

219. This section of the evaluation makes recommendations for consideration in future BDM and other related projects. In particular, it addresses the application of the lessons learned and suggests to the way forward.

A. Applications of the lessons learned

220. The BDM project has become a model project for other developing countries. It has been effective in introducing new biodiversity concepts and building institutional capacities. For the complete success of the entire project, however, implementation of the proposed activities at the national level should be pursued vigorously. This implementation should be the focus of further discussions with GEF and UNEP.

221. Addressing biodiversity issues requires cross-sectoral and transboundary approaches and operations. Regional BDM projects to bring together countries sharing transboundary resources should be considered. The human resources capacity built by the BDM project in the participating countries could be utilized in the new projects. It will be necessary to support regional BDM secretariats to undertake the following tasks: organization of regional BDM workshops; production of a regional BDM newsletter; maintenance and update of databases and metadatabases relevant to regional biodiversity; operation of a clearing-house mechanism to promote information and data exchange; and identification of capacity-building and skills development needs.

222. In those countries where the national capacity in biodiversity data management is low, it is important for the project to focus primarily on capacity-building and skill development through a greater number of training sessions and workshops. Support should be provided to persons from the participating countries to attend the training-the-trainers workshops in biodiversity information, such as that hosted by WCMC from 17 to 21 March 1997. This training exercise was built on and benefited from the support of UNEP through the BDM project. Follow-up training sessions should subsequently be conducted by the workshop participants in their respective countries.

223. The lessons learned, as outlined in chapter V on the project design, project implementation, national capacities and the role of beneficiary countries and chapter VI on capacity-building, implementation of BDM plans, private sector participation, completion of project products, clearing-house mechanisms, the role of steering committees and regional and global linkages, should receive serious consideration during the planning of the next phase of the BDM project.

224. A new component suggested for introduction in future BDM projects is the development of the capacity to turn biodiversity data into information products that can easily be used by the decision makers.

225. The global umbrella project approach as used in the BDM project provides a tremendous opportunity for countries to share their experiences in dealing with similar biodiversity issues. Exchange of the lessons learned is of great importance in enhancing the BDM project and should be promoted through continued meetings, workshops and training courses.

B. Way forward

1. *Maintaining momentum and expanding impact*

226. The BDM project is losing momentum and needs to be reactivated. A follow-up project is required to build on and expand upon the foundations established by the BDM initiative. The continuing projects and other new projects should, however, give greater consideration to sustainability. A source of sustainable revenue might have been created if this had been considered from the beginning and if the project products were more appropriately designed for commercial applications and uses. The momentum of the BDM project could also be maintained by raising journalists' awareness of the project objectives and activities, and the achievements of the project to date. This could be achieved through journalists' workshops on the BDM project. A good example is the journalists' workshop which was organized in Kenya in May 1997.

227. Every effort should be made to make sure that the incomplete outputs are achieved. In countries like Ghana and the Bahamas, a "rescue plan" needs to be put in place to ensure that the project outputs are completed before the end of 1998. Short-term technical missions should be carried out to assist these countries to complete the process.

228. The BDM plans are a major output of this project and the future of the BDM project is dependent on these plans. Implementation of these plans is doubtful unless external support in finances and technical assistance are provided. The issue of the implementation of the BDM plans should be the focus of serious attention by GEF and UNEP.

229. In future BDM projects, the trained people who have been involved in implementing the BDM project could offer biodiversity data management training to new countries with deficiencies in information technology personnel. This is applicable in eastern Africa and the ASEAN and Caribbean regions. Collaboration of this kind would help initiate the necessary regional linkages.

230. Further support is required for the BDM project in the participating countries to maintain momentum and to give the countries sufficient time to work out mechanisms to sustain the project. UNEP and GEF should support similar activities with a new group of countries. Consideration should be given to countries close to those which have already carried out the project, in order to initiate the component of regional linkages and collaboration. Close attention should be given to the lessons learned in the pilot phase in designing the new projects.

231. The future of the BDM project is dependent on the implementation of the BDM plans and UNEP and GEF should provide support to the 10 participating countries to implement these plans. If this does not happen, the efforts made during the pilot phase of the project may not

amount to much, since there is a likelihood that the BDM project will come to a grinding halt without additional support.

232. In supporting a group of new countries to carry out the BDM project, UNEP and GEF should use a similar approach but the lessons learned from the pilot phase should be taken into serious consideration. It is recommended that the project implementers from the participating countries should meet mid-way through the project in order to share their experiences.

2. *National BDM steering committees*

233. Multi-sectoral and high-level national BDM steering committees should be established and those in place should continue to operate on a more permanent basis to undertake follow-up on BDM activities, such as the implementation of the BDM plans. Financial and logistical support should be provided to these committees. Composed of senior, respected and reputable individuals, the steering committees will provide an essential and influential front to the project's activities. The coordinating national institutions also need to be strengthened by providing full-time project coordinators and core staff for the BDM project.

234. The role of the steering committees was not given adequate emphasis at the initiation of some projects. This has emerged as a clear prerequisite for ensuring the success of the BDM project. In future BDM projects, the composition of the steering committees should receive serious attention and their role accorded the importance it deserves.

3. *National biodiversity monitoring centres*

235. The BDM units could be developed into national biodiversity monitoring centres responsible for gathering and analysing data at the country level for decision-making and biodiversity management. Such centres can help determine conservation priorities and goals; generate the data necessary to build biodiversity conservation into the national planning process; and supply the early warning information necessary for the rapid response to new threats.

4. *National biodiversity strategies and action plans*

236. The activities of the NBSAP process will involve, *inter alia*, the establishment of multi-sectoral steering committees and technical planning teams, the review and synthesis of existing information, national and subnational consultative seminars and workshops and the identification of options and priorities. The NBSAP process has a great deal to learn from the BDM project. The possibility that the implementation of BDM activities will complement NBSAPs gives much hope for continuation of the BDM project.

237. Linkage of the implementation of BDM plans with the ongoing activities of NBSAPs as a complementary activity is essential, since the BDM plans are crucial in providing the information and data required for the success of NBSAPs.

5. *Enhancing biodiversity information availability*

238. Enhancing biodiversity information availability and communication is crucial for developing countries. This could be done through the promotion of basic data collection, more systematic use of GIS technology, electronic networking, and improved communication through print and electronic media. Training will be equally important for the public sector, the private sector and local non-governmental organizations.

239. Information exchange can be facilitated through a variety of means, ranging from newsletters, publication of project results, conferences, workshops, and scientific exchanges to on-line electronic data communications. The clearing-house mechanisms could help promote and facilitate technical and scientific cooperation between institutions, both locally and internationally. To facilitate the coordination and exchange of biodiversity information, the clearing-house mechanisms should be established following the model of the BDM units. The establishment of the clearing-house mechanisms should be considered a top biodiversity conservation priority.

240. While the network model of a national information management strategy relies on a diversity of specialized institutions, the effectiveness of the network as a whole depends on the quality of its components. Careful and honest consideration of institutional capacity is, therefore, a key to any successful national information management effort.

VIII. BDM EVALUATION WORKSHOP

241. This chapter presents briefly the proceedings of the BDM evaluation workshop held in Washington, D.C., on 11 and 12 June 1998. In particular, it deals with the workshop structure, presentations by participants, group discussions, workshop findings and recommendations, and the workshop conclusions.

A. Workshop structure

242. The workshop was structured to include plenary presentations, plenary and small-group discussions and the formulation and presentation of recommendations and conclusions. Eight of the 10 countries involved in the BDM project, namely, the Bahamas, Chile, China, Costa Rica, Egypt, Kenya, Papua New Guinea and Thailand, attended the workshop. Ghana and Poland were unable to attend. In addition, the workshop was attended by representatives from UNEP, the GEF Secretariat, WCMC, the BDM advisory committee, Chemonics International, Inc., (coordinators of local consultants) and the Sparvs Agency (international consultant). The workshop was chaired by Mr. Scott Smith, Monitoring and Evaluation Officer with the GEF Secretariat. A list of the workshop participants is provided in Annex II.

B. Workshop presentations

1. *Opening of the workshop*

243. The workshop was opened by Mr. Jarle Harstad, Chief, Monitoring and Evaluation, GEF Secretariat. He reaffirmed that the BDM project was a global project with benefits at the country level. The BDM project was an enabling activity to build capacity for the implementation of the Convention on Biological Diversity and NBSAPs. The BDM project complemented other GEF/UNEP projects, such as the country studies and NBSAP projects, and constituted an important component of the biodiversity planning process.

244. In his statement, Mr. Harstad suggested that the BDM evaluation report could contribute to other evaluations of GEF-supported enabling activities. The BDM project, as a whole, would also test national and global linkages and make an important contribution to the development of the clearing-house mechanisms.

2. *Background and overview of the BDM project*

245. Background information and an overview of the BDM project were presented by Mr. Feargal Duff of UNEP, task manager for the BDM project. He outlined the various stages of the project implementation at the umbrella level. The BDM project had commenced in June 1994 and was planned to end in May 1997. It had, however, encountered some delays and would have to be extended. Agreements for the national subprojects had been concluded by January 1996 and the core outputs of the project had been completed in most of the countries. In some countries, adjustments were being made to the BDM plans, following review by UNEP, WCMC and the BDM advisory committee. In most countries, preparation of the national resource

inventory was seen as an ongoing long-term effort which needed continuous updating.

246. A BDM advisory committee had been established to provide advice on technical, organizational and project management matters as part of a collaborative effort. This committee was composed of a group of experts from organizations with expertise in the field of biodiversity information management. A subproject agreement had been concluded with WCMC in June 1994 for the preparation of a set of BDM support materials intended to raise the profile of biodiversity information in decision-making processes. A BDM network had been established on the Internet. The list server established by UNEP had not been extensively used the reasons being that some countries had no access to the Internet. Other countries simply did not bother to use it.

247. He suggested that, as the clearing-house mechanism of the Convention on Biological Diversity evolves, the BDM project might be used as a model for national clearing-house mechanism development–in other words, the processes of consultation, institutional survey, formulation of best practices and strategic planning could be packaged to assist countries develop national clearing-house mechanisms.

3. *Overview of BDM supporting materials*

248. An outline of the processes involved in the preparation of the BDM supporting materials was presented by Mr. Jake Reynolds, Knowledge Management Coordinator, WCMC. He explained that three types of supporting materials had been produced by WCMC. These included: the *Electronic Resource Inventory*, the *Guide to Information Management*, and the *Guide to National Institutional Survey*. The Electronic Resource Inventory provided a useful "kick start" at the beginning of the project and reflected the breadth of the work involved. It could, however, be developed further to emphasize the sharing of best practices.

249. The *Guide to Information Management* was widely used by the participating countries. It provided the conceptual basis for linking biodiversity data and policy. The guide, though theoretical, was process-oriented and shifted the emphasis away from technology. Its contents had been extended, refined, and re-organized since its publication, following the incorporation of comments and inputs from the participating countries. Biodiversity strategies and action plans, and clearing-house mechanisms initiatives had also been explored and incorporated. More case studies would be included in a future edition.

250. With regard to the national institutional survey, he said that its real value lay in long-term networking. Its current focus was on mobilizing scientific data for policy-making. The long-term value of the national institutional survey was the sharing of the best practices and enabling actions through the clearing-house mechanisms. The BDM project was essentially a "bottom-up" approach to biodiversity data and information management, involving many stakeholders, and as such it was key to the evolving clearing-house mechanisms.

4. *National papers*

251. The workshop session on national papers was chaired by Mr. Backson Sibanda, Chief, Evaluation Unit, UNEP. Brief round-table presentations of national papers (in the form of two-page reports) prepared for the workshop were made by the country representatives. The presentations focused on the main issues raised in the papers and other issues considered important for discussion at the workshop.

(a) *Bahamas (Carolann Albury)*

252. In designing a BDM system, the Bahamas report highlighted the need to consider the special characteristics of the geographic distribution of the land masses and population, in accordance with which, in the Bahamas each island is seen as a distinct component of the BDM system. Practical achievements of implementing the BDM subproject included: the identification of the BEST Commission as the hub or clearing-house mechanism, the development of a metadatabase on scientific research; and the development of the BEST Commission's GIS node. In addition, among more general benefits flowing from the project were improved agency networking and heightened awareness of biodiversity issues.

253. During the implementation of the BDM subproject, the Bahamas BDM team was faced with serious constraints which were ultimately due to poor project management. This resulted in fragmented participation, poor communication, delays in project activities and limited technology transfer. The BDM plan is currently in its final development phase and will not only be submitted to the Cabinet for approval and support for identifying funding sources, but will also be submitted to UNEP to secure technical assistance in carrying out the plan's recommendations. Key issues identified for discussion were the development of web sites, formal agreements for exchange of information, and metadata standards.

(b) *Chile (Consuelo Munoz)*

254. In Chile, the implementation of the BDM subproject, the establishment of a web site and the development of supporting materials for biodiversity data management have made it possible to design and structure the biodiversity information system. The Chile report highlighted several national commitments relating specifically to biodiversity data management, and to the conservation of biological diversity in general. The first commitment at the national level is the enactment of an environmental law (Law 19.300) which, in its article 70, mandates CONAMA to maintain a national system of environmental information (SINIA). SINIA has officially incorporated the BDM plan as part of its structure and design.

255. The second commitment is the ratification of the Convention on Biological Diversity in 1995. This obligates the country to implement the provisions of the Convention, including the establishment of the clearing-house mechanism. The third commitment is the implementation of IABIN, in response to the 31st Agreement of the Plan of Action for Sustainable Development, which was endorsed in the Hemispheric Summit of the Americas, held in Santa Cruz, Bolivia, in December 1996. The fourth commitment is the implementation of the National Environmental Policy for Sustainable Development, approved in January 1998. In future, the BDM subproject will develop connections with other countries participating in biodiversity data management and

develop further the clearing-house mechanism pilot phase. The final BDM subproject report will be distributed to the users in 1998.

(c) *China (Dehui Wang)*

256. China implemented the BDM subproject from December 1995 to December 1997. Led by the National Environment Protection Agency (NEPA), subsequently upgraded to ministerial level and renamed the State Environment Protection Administration (SEPA), the BDM team has completed the subproject outputs as specified by the contractual agreement. China is now able to access biodiversity information scattered in various departments. It has designed a plan for the establishment of the national centre for biodiversity information and has established a national biodiversity data and information network.

257. One of the factors contributing to the success of China's subproject is the national mandate of SEPA to implement the provisions of the Convention on Biological Diversity. SEPA relied on an inter-departmental BDM coordinating group and a multi-disciplinary expert advisory team. During implementation of the subproject, China sent a team of six officials to WCMC, Cambridge, United Kingdom, for training on biodiversity information management. On completing the project, SEPA organized a team of local experts to evaluate the project results. The local experts confirmed the achievements and put forward proposals for follow-up work to propel the BDM project forward. In 1998, China will set up a home page on national biodiversity and make preparations for networking with the secretariat of the Convention on Biological Diversity. By August 1998, China hopes to complete a project proposal on a national biodiversity information network and capacity-building and to submit this to GEF through UNEP for funding. The Chinese Government will also provide part of the funding support.

(d) *Costa Rica (Erick Mata)*

258. The implementation of the BDM subproject in Costa Rica represents the only case where the subproject was executed by a non-governmental organization. INBio was selected as the project executant for the subproject, known as the BioData project. The project outputs were all achieved, with the exception of the national resource inventory, which will be completed in 1998. Some of the outputs include the web page and CD-ROM. The BioData project is in digital format. The web page addresses the issue of biodiversity information availability. COABIO has endorsed the project and plans to include the BDM plan in its national biodiversity strategy.

259. Costa Rica has a new national biodiversity law which is likely to enhance implementation of the BDM plan. The new law, enacted on 27 May 1998, changes the political arena. COABIO will undergo major changes in its functions and organization. The BDM plan is currently being reviewed.

260. SINAC has expressed interest in supporting implementation of the plan, as a continuation of the BDM subproject. Financially, the BDM network does not have the means to implement the plan. The IABIN and the CCAD initiatives represent mid-term alternatives for funding. The

second phase of the BDM subproject will develop the metadata standards. Costa Rica recommends strengthened South-South cooperation, especially in the area of training and skills development.

(e) *Egypt (Esam Ahmed Elbadry)*

261. A major practical achievement of the BDM subproject in Egypt is the enhancement of the national capacity to manage biodiversity data. Biodiversity data management was relatively new in Egypt, and there was limited national expertise in that area. The subproject helped to galvanize action to begin building the necessary national capacity. The importance of biodiversity data management became a national priority and was highlighted in the national biodiversity strategy. Egypt has still to upgrade the BDM capacities (e.g., equipment, software and training) of national stakeholders, in order to have a viable national biodiversity information network.

262. Following the BDM subproject, GEF has provided funds to Egypt to purchase equipment for use in developing the clearing-house mechanism. The European Union has also provided funding of 50 million ECU for the establishment of new protected areas in Egypt. It is hoped to continue to develop the BDM capacities of the national biodiversity database through the institutional support programme of the Egyptian Environmental Affairs Agency and the European Union. It is also hoped that there will be follow-up projects to build on the efforts undertaken to date and develop a comprehensive biodiversity information network for Egypt, in particular to develop the BDM capacities of the referral collections and other key stakeholders around the country.

(f) *Kenya (George Kinuthia)*

263. The implementation of the BDM subproject in Kenya commenced in December 1996 and will be fully completed in 1998. The subproject encountered some delays in implementation owing to the slow rate of return of completed questionnaires for the national institutional survey. Other delays resulted from lengthy government procedures in the procurement of goods and services. However, multi-stakeholder participation in the workshops ensured that implementation of the subproject was well coordinated. The BDM project has laid a firm foundation for the establishment of the clearing-house mechanism, by identifying sources of data and existing data gaps, by proposing a suitable networking infrastructure and by strengthening the clearing-house mechanism focal point. A major achievement of the BDM subproject was capacity-building at the national focal institution.

264. Kenya recommends the sharing of experience gained in implementing the BDM subproject through the provision of assistance to the countries that may implement the BDM process in future. The Government of Kenya is committed to the implementation of the BDM plan but the resources available for this are limited and, therefore, the continuity of the BDM activities will be subject to availability of funding. It is intended to implement the BDM plan in three phases. The first phase will focus on training, establishment of the implementation team, transfer of technology through expert consultancy and the setting in place of a networking infrastructure. In

the second phase, the data application process will commence. This will include the drawing up of data standards, information exchange procedures, collection of primary data to fill information gaps and the development of information products and their dissemination. In the third phase, data application will continue, especially data collection and maintenance.

(g) *Papua New Guinea (John Genolagani)*

265. The Papua New Guinea BDM activities were initiated in October 1994. The subproject was implemented by the Papua New Guinea Department of Environment and Conservation. All the outputs have been successfully completed with the exception of the information management guidelines, a product which Papua New Guinea felt required more details from in-country experiences in order to develop the requisite guidelines and protocols. One major achievement was a national consensus on custodianship of the metadatabase and specific datasets.

266. The BDM subproject contributed to the implementation of the World Bank/GEF/AusAID BioRAP project. Through BioRAP, the Department of Environment Conservation developed its first in-country formal data access and transfer agreements between itself and the National Weather Service. In addition, the Department has entered into a similar agreement with Chevron Services, Australia. The BDM subproject has supported many other initiatives in the country. Some of these include: the national initiative on intellectual property rights; the preparation of the NBSAP; and the development of a new national environmental management policy (1996) based on the total catchment regime. The experience gained by Papua New Guinea can be extended to other countries in the region, particularly the Melanesian countries (Fiji, Solomon Islands, Vanuatu), which share similar culture and resource tenure systems. The implementation of the BDM plan is just starting.

(h) *Poland (Poland was unable to attend the workshop but submitted a two-page report a few days before the workshop)*

267. Poland has a tradition more than 200 years old of collecting biodiversity data, of various kinds, using different techniques and procedures, with as many as 800 institutions identified as important for biodiversity data management. The need to unify the data collection process within and between institutions and to establish an efficient system of data flow and exchange was addressed by the BDM subproject. The special role of the Internet cannot be underestimated, as it is necessary to create links and multilateral web sites to enhance the flow of information at the international level.

268. The BDM plan is crucial for the implementation of modern information management policies within the scope of biodiversity conservation in various sectors, including agriculture, forestry, transportation and marine economy. There is also a need to incorporate the clearing-house mechanism into the country's NBSAP to ensure its successful implementation country-wide. Institutional capacity-building requires substantial funding and it was realized how important the assistance provided by the GEF/UNEP BDM umbrella project was, to this end, during the subproject implementation.

(i) *Thailand (Praopan Tongsom)*

269. In Thailand, OEPP, the country's office for environmental policy and planning, implemented the subproject and became the hub of the biodiversity information network. The office will also operationalize the clearing-house mechanism. The main subproject products were: Thailand's BDM action plan; the national guideline on biodiversity data management; and the national institutional survey. OEPP plans to put the action plan and the guideline on the Internet in mid-1998.

270. The BDM plan has been endorsed by Thailand's working group on biodiversity. Some aspects of the guidelines and the action plan have been integrated into the country's national policies, measures and plans on the conservation and utilization of biodiversity (1998-2002). It is expected that, with the establishment of the national committee on the conservation and utilization of biodiversity, implementation of the guidelines and action plan, especially the establishment of the biodiversity information network, will become the responsibility of the national centre under the new national committee's supervision. The Government has agreed, in principle, to allocate a budget of 27 million baht to establish a biodiversity data network. To date, however, only 336,000 baht has been released for the implementation of the BDM recommendations. Full implementation of the action plan will depend on future funding. In view of the current economic crisis in the country, such funding will have to be supplemented from external sources.

5. *Overview of local consultants' reports on BDM implementation at the country level (Steven Njuguna, international consultant)*

271. In this presentation, the consultant highlighted the key issues raised in the local consultants' reports on the 10 participating countries, in connection with the implementation of the BDM project at the country level. He placed more emphasis on the realization of project objectives, BDM activities, outputs and the overall impact of the project, including lessons learned. He also enlarged on the importance of the BDM and its role in supporting various activities in the overall biodiversity planning process.

272. The evaluation methodology was presented as a multi-stage process, beginning with a separate evaluation of each country-level subproject coordinated by Chemonics International, Inc., a consulting firm contracted by GEF. The international consultant was recruited by UNEP to synthesize the findings of the subproject evaluations into a draft evaluation report of the overall project. The draft evaluation report was presented at the workshop for review and comments and formed the main part of the workshop resource materials. The results of the workshop discussions and recommendations were to be incorporated into the final evaluation report.

273. Emerging issues from the synthesis of the local consultants' reports were presented. These included: incomplete project outputs; capacity-building; implementation of BDM plans and, publication and the dissemination of products; clearing-house mechanisms; role of advisory and steering committees; regional and global linkages; and project sustainability. It was

recommended that future BDM activities be integrated with other initiatives, such as NBSAPs, clearing-house mechanisms, and national biodiversity monitoring centres.

274. On the whole, the BDM project was deemed appropriate, timely, significant and crucial in terms of the national needs for improved capacity to manage and use biodiversity data and information. The BDM project was adjudged highly effective in increasing the awareness of the importance of biodiversity data management, in particular, and the conservation of biological diversity, in general. The consultant felt, however, that the full impact of the BDM project remained contingent on the participating countries and donor agencies making available funding to continue the activities outlined in the BDM plans.

C. Group discussions

275. The workshop participants were split into two separate working groups (the first chaired by Mr. Backson Sibanda, and the second chaired by Mr. Scott Smith) to discuss the main issues highlighted in the national reports and the local consultants' reports and to formulate general recommendations and conclusions. The following topics were provided to the two groups in order to focus their discussions:

(a) Incomplete project activities and consideration of what needs to be done to complete them; plans and prospects;

(b) BDM plans: implementation and the way forward; challenges and integration with other national initiatives;

(c) Experience with biodiversity information exchange among the participating countries; regional and global linkages; respective roles of UNEP and GEF;

(d) Capacity-building accomplishments: reasons for success or shortcoming;

(e) Sustainability of activities supported by the project: prospects;

(f) Project methodology and materials: feedback from pilot phase experience; usefulness of the materials for other countries; consideration of what made some activities successful and others not successful.

276. The results of the group discussions on country-specific issues have been incorporated in the relevant sections of the final evaluation report. The general recommendations and conclusions are presented below.

D. Workshop findings and recommendations

277. During this segment of its deliberations, conducted under the chairmanship of Mr. Sibanda, the workshop reached the findings set forth below.

1. *Incomplete project activities*

278. The BDM project should be viewed as a continuing process. All the participating countries have committed themselves to completing all the project activities, including publication and dissemination of the project products, and refining the BDM plans. This should be done with the remaining project funds. In those countries where the funds have been exhausted, however, the individual countries should take responsibility for finalizing the project activities.

2. *Implementation of the BDM plans*

279. The implementation of the BDM plans will ensure the success of the entire BDM project. There is a clear commitment from national Governments to implement the BDM plans because of their supporting role in the broad implementation of the Convention on Biological Diversity. Domestic sources of funds should be identified to keep the process going. Source-books of alternative funding, local and international, should be prepared. There is a need for international support in implementing the BDM plans, especially in those areas relating to incremental costs.

3. *Regional and global linkages*

280. There is a logical link between BDM activities and the clearing-house mechanisms. There is also a need to make BDM activities part of the workplan of the clearing-house mechanism, as approved by the Conference of Parties to the Convention on Biological Diversity in Bratislava in 1998. The "bottom-up" approach used in the BDM project could serve as a good model for the development of clearing-house mechanisms at its fourth meeting. The clearing-house mechanism as currently conceived is implemented in a "top-down" fashion.

281. UNEP and GEF should consider the production of a short publication summarizing the results of the BDM project. This "know-how" publication on BDM experiences should be designed for a very wide audience, including senior government decision-makers and non-governmental organizations internal and external to the project. It should be placed on the Internet and also distributed by other means such as e-mail and hard copy. Potential contents of the publication could include:

(a) Background to the project, objectives, activities, outputs, etc.;

(b) Project approach (stakeholders, consultation processes, concepts);

(c) Evaluation process;

(d) Country experiences (two-page reports presented at the evaluation workshop);

(e) Lessons learned; and

(f) Recommendations for future activities.

282. Networking among the countries should be enhanced. Connections should be established by telephone, fax and e-mail. All communication options should be explored. Countries should be encouraged to "think globally and act locally". Possibilities exist for regional linkages, by making use of such existing facilities as IABIN, the Central and Eastern Europe Network, the West Africa Biodiversity Information Management Network, the Eastern Africa Biodiversity Network, and Melanesia (Fiji, Solomon Islands, Vanuatu,). Global linkages could be established with the Environmental Resources Information Network (ERIN) of Australia, Conservation International, Birdlife International, TNC, CBIC, ETI, CABI, and IUCN.

4. *Capacity-building*

283. Capacity-building was achieved at the individual level. At the institutional level, capacity-building was not so successful, however. There is need for more capacity-building at the national level.

284. The clearing-house mechanism hub team could be mandated to provide BDM-type training at the national level. There is a serious need to develop a critical mass of people to ensure the continuity of BDM activities. Training and capacity development needs should be assessed at the beginning of the project. The train-the-trainers model is useful for a project of the BDM type. South-South cooperation should be promoted in the form of more experienced participants providing facilitation services in countries embarking on BDM-type activities. A focal national institution or entity should be identified to expand and coordinate training locally and regionally. It is important to tap existing regional experience in biodiversity data management.

5. *Sustainability of projects*

285. The sustainability of BDM projects should be considered at the project design phase and should take the following into account:

(a) Integration of the BDM project with government activities and relating the BDM project to national mandates, e.g., NBSAPs;

(b) Integration of the BDM project with regional activities;

(c) Focus on products and other deliverables; and

(d) Identification of alternative sources of funding, local and international. The funding should be sourced early enough to provide for adequate lead time before project implementation.

6. *Project methodology and materials*

286. The initial methodology of project development was inadequate. All the participating countries should have been involved in the project design at the very outset. Pre-project surveys

of the country needs, strengths and weaknesses should be carried out in order to determine where to place emphasis. Countries should participate both from the inception of the project and during the development of the supporting materials, in order to arrive at a common denominator.

287. New countries should give serious consideration to obtaining access to information technology. Progress of the project could depend directly on the availability of information technology. Countries should adapt the information technology schedules, programmes, and services to available technology such as electronic (Internet and others) and print media. The project should take into account country differences and analyse the factors explaining such differences, for example, the technology available and project management capacity.

288. South-South cooperation should be discussed during project design as a two-way process, especially if one country has implemented the BDM project. This would save time and resources if old participants provided services such as facilitation in new projects. This would also build on the experience gained in implementing the pilot phase of the BDM. Finally, in formulating new proposals for BDM activities, it is important to make sure that high national priorities include BDM and to emphasize the role of BDM in supporting other biodiversity planning activities.

E. Workshop conclusions

289. The BDM process has been initiated and a framework put in place. The BDM pilot project has provided both the means and the way forward. The next steps in the process involve building on what has been started. The "bottom-up" approach followed in implementing BDM activities provides a good model to be followed in the development of clearing-house mechanisms.

290. The umbrella project advisory committee could have provided better global linkages, making use of its members' involvement with global biodiversity information networks. The committee should have been facilitated to play a more active role, with funding allocated to enable the members to participate in national and regional workshops. In the project design, no budget line was allocated for the active participation of the advisory committee.

291. Implementation of the activities identified by BDM plans presents a challenge for the future. Linkage of BDM activities with other national initiatives, such as NBSAPs and clearing-house mechanisms, is important. The implementation of the BDM plans should be formulated as new project proposals and not as second-phase extensions of the pilot phase.

292. Participating countries should not rely entirely on UNEP and GEF to implement the BDM plans, but should seek alternative funding. GEF is unlikely to provide support for another group of countries to undertake BDM projects, but could support BDM activities formulated to support other national biodiversity conservation initiatives. UNEP and GEF, however, having implemented a pilot phase of BDM activities, should conduct a follow-up exercise to implement the lessons learned. UNEP regional offices should promote BDM-type activities and look for funding opportunities from other sources. The proposals on BDM activities should indicate the

contribution of biological data management to national, regional and international biodiversity activities.

293. The multi-stage evaluation process involving local consultants, the international consultant and the evaluation workshop was quite effective and saved a considerable amount of time. The local consultants produced good reports, thanks to their sound knowledge, contacts and familiarity with their respective countries' unique and special circumstances.

294. Finally, there is a clear commitment by the participating countries to continue with the BDM process, provide human and technical resources and seek alternative funding to implement the activities identified in the BDM plans.

Annex I

LIST OF REFERENCES

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Annex II

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Annex III

BDM EVALUATION WORKSHOP AGENDA
(Washington, D.C., 11-12 June 1998)

Provisional agenda

1. Opening of the workshop.

2. Organization of the workshop.

3. Adoption of the agenda.

4. Background and overview of the project at the umbrella level;
   Overview of BDM supporting materials.

5. Brief round-table presentations of national papers prepared for the meeting.

6. Overview of local consultants' reports on BDM implementation at the country level.

7. Discussion of main issues highlighted in the national reports and local consultants' reports.
   (Meeting should split into separate working groups for this item).

8. Lessons learned; conclusions; recommendations.

9. Closure of the meeting.

Annex IV

BDM EVALUATION WORKSHOP: PROGRAMME OF WORK (Washington, D.C., 11-12 June 1998)

Day 1: Thursday 11 June 1998

Morning session

0930-0945 Agenda item 1

Opening remarks by Mr. Jarle Harstad, Chief, Monitoring and Evaluation, GEF Secretariat.

0945-1000 Agenda item 2

Organization of the workshop:

(a) Adoption of the agenda;

(b) Session and hours.

1000-1010 Agenda item 3

Adoption of the agenda (see provisional agenda).

1010-1040 Agenda item 4

Background and overview of the project at the umbrella level/
Overview of BDM supporting materials by Feargal Duff, Biodiversity Unit, UNEP, and Jake Reynolds, WCMC.

(This item will highlight the process of project implementation at the umbrella level and the process involved in the preparation of supporting materials).

1040-1100 Coffee and tea break

1100-1200 Agenda item 5

Brief round-table presentations of national papers prepared for the meeting.

(For this item, countries will give, not more than 5 minutes, presentations focusing on the main issues raised in their papers and/or other issues they would like to see discussed at this meeting).

1200-1230 Agenda item 6

Overview of local consultants' reports on BDM implementation at the country level by Steven Njuguna (international consultant).

(This item will highlight key issues raised concerning BDM implementation, emphasizing the realization of project objectives, activities, outputs, and overall impact of the project including lessons learnt).

1230-1400 Lunch break

Afternoon session

1400-1530 Agenda item 7

Discussions on main issues highlighted in the national reports and the local consultants' reports.

(The meeting should split into separate working groups for this item to elaborate on and prioritize the main issues).

1530-1545 Coffee and tea break

1545-1730 Agenda item 7

Working group discussions.

Day 2: Friday 12 June 1998

Morning session

0900-1040 Agenda item 7

Working group discussions.

1040-1100 Coffee and tea break

1100-1230 Presentation of draft recommendations (plenary)

1230-1400 Lunch break

Afternoon session

1400-1530 Presentation of draft recommendations (plenary)

1530-1545 Coffee and tea break

1545-1730 Presentation of final recommendations and conclusions (plenary)

1730-1745 Agenda item 9

Closure of meeting

Annex V

GUIDELINES FOR LOCAL CONSULTANTS

I. Background

295. The purpose of the project is to assist developing countries organize, maintain and use data generated, inter alia, by the country study process, in order to support conservation and sustainable use of biological diversity. The project is to enhance the capacity of developing countries in data management to support the implementation of the Convention on Biological Diversity as required by article 7 of the Convention. It also contributes to the implementation of Agenda 21.

II. Scope of the evaluation

296. This evaluation will comprise assessments of the following:

(a) How the country prepared for the project;

(b) If a national biodiversity unit was established and what other bodies were already in place;

(c) The process of recruiting the BDM team: the issues to look at would be the timing of the recruitment–i.e., was it before or after the signature of the project?–composition of the team; national versus foreign consultants;

(d) Assess if and the extent of interaction between UNEP and government agencies on project design, preparation and implementation;

(e) Process in preparing and finalizing the subproject document:

(i) Process followed in project implementation, e.g., conducting the national institutional survey and BDM workshops, etc.;

(ii) Evaluation of core outputs, i.e., national institutional survey and BDM plans;

(f) Level of co-financing;

(g) Assess whether the capacity of the country in biodiversity data management was enhanced.

297. The evaluation will cover the years 1995/96-1997 and will review the country project against the overall project objectives, the Convention on Biological Diversity Articles 6, 7 (a) (b) (c) and (d) as well as against chapter 15 of Agenda 21, which highlights the need for better information as the basis for sustainable development and conservation of natural resources.

298. The evaluation will involve intensive and extensive information gathering through review of documentation, at the country project offices and interviews with relevant participants and stakeholders.

III. Terms of reference for the local consultants

1. Establish if, how and to what extent the project met its stated objectives.

    (a) How the country prepared for the project.

    (b) Has the project produced the expected results and have those results led to the achievement of the objectives?

    (c) Were the outputs attained and have they contributed to the achievement of results?

    (d) Have the results satisfied the identified needs of the country?

2. Determine the appropriateness of the project in relation to the country needs, the Convention on Biological Diversity, Agenda 21 and the UNEP aim to support and assist developing countries to better manage biodiversity data.

3. Determine the effectiveness of this country BDM project by assessing:

    (a) Effectiveness of BDM workshops;

    (b) Sectoral and stakeholder participation in workshops and other key project activities;

    (c) Were data quality and data availability improved as a result of the project?

4. Evaluate the extent and quality of support, i.e., technical assistance provided to the national biodiversity unit or implementing body during project implementation. The consultant should assess other forms of assistance provided to the national biodiversity unit.

5. Assess what and the level of follow-up action that is needed for the future implementation of the country BDM plan.

6. Determine if and to what extent this project has contributed to the biodiversity planning, country study and NBSAP in the country, as well as what impact this has created in the management of biodiversity data.

7. What capacity-building has been facilitated by this project?

8. Examine institutional arrangements at the country level and how these enhanced or hampered the implementation of this project. Also assess the relationship between UNEP and the country project and how this relationship impacted on the project.

9. Study the problems/success of the project with a view to drawing lessons learned from this project.

10. Produce concrete recommendations for the future implementation of the BDM plans and for future improvement of these efforts by UNEP and GEF.

Annex VI

GUIDELINES FOR THE INTERNATIONAL CONSULTANT

I. Background

299. The purpose of the project is to assist developing countries organize, maintain and use data generated, *inter alia*, by the country study process, in order to support conservation and sustainable use of biological diversity. The project is to enhance the capacity of developing countries in data management to support the implementation of the Convention on Biological Diversity, as required by Article 7 of the Convention. It also contributes to the implementation of Agenda 21.

II. Scope of the evaluation

300. The evaluation will assess to what extent the BDM has facilitated the enhancement of the capacity of participating countries in biodiversity data management and exchange as required by the Convention on Biological Diversity, covering, *inter alia*:

(a) The project's contribution to the biodiversity planning processes in participating countries;

(b) How, and to what extent, the project objectives were met;

(c) The quality, effectiveness and usefulness of the project outputs;

(d) The project's contribution to ongoing and emerging initiatives, such as the clearing-house mechanism of the secretariat of the Convention on Biological Diversity;

(e) The process followed by countries undertaking the BDM project at the national level;

(f) The overall role and effectiveness of UNEP in project implementation.

301. By using the country-level evaluation reports, the overall project evaluation will analyse in full the impact created by these projects in enhancing the capacity of the participating countries in biodiversity data management.

III. Terms of reference for the international consultant

302. The international consultant will review the local consultants' reports and do the following:

(a) Prepare a summary of the main issues raised in these reports;

(b) Determine how and to what extent, the stated project objectives were met;

(c) Determine the appropriateness of the project by reviewing the basis on which the project was created. Has the project responded to identified needs?

(d) Establish if the results were achieved and how these results contribute to the project objectives;

(e) Analyse the quality and usefulness of the project outputs, determine if these outputs were attained as well as determine how they contribute to the attainment of results and the overall objectives. How can these outputs contribute to present and future GEF projects?

(f) Determine the following:

(i) The process followed by the countries in preparing and finalizing project documents;

(ii) Extent and time of interaction between UNEP and government agencies and/or other stakeholders in project design and preparation;

(iii) Existence and extent of involvement by all relevant government agencies;

(iv) Cooperation between implementing agency and task manager;

(g) Establish the level of government ownership and co-financing;

(h) Determine the following:

(i) Effectiveness and efficiency of the project in promoting biodiversity data management in the 10 developing countries;

(ii) Effectiveness of BDM workshops;

(i) Review the organizational arrangements, management and financial systems and see how these impacted the implementation of projects;

(j) Review the adequacy of the monitoring and evaluation system developed to supervise and implement the project;

(k) Consider how this project supports the role of UNEP in GEF and how the project adds to the UNEP core programme;

(l) Determine if and how the project has built capacity at the national level;

(m) Establish if the project is sustainable and replicable;

(n) Present the problems and constraints encountered in project development and implementation;

(o) Discuss the lessons learnt from this project and how other projects can benefit from these lessons;

(p) Propose concrete and realistic suggestions or recommendations needed to improve this project and other GEF projects in the future;

(q) The international consultant will attend the evaluation meeting and do the following:

(i) Present major issues from the evaluation reports;

(ii) Prepare a report of the meeting;

(iii) Utilize the results of the meeting in preparing the final evaluation report.

Annex VII

LIST OF LOCAL CONSULTANTS

Bahamas	Dr. Kathleen Sullivan Sealey Associate Professor Department of Biology University of Miami, Florida and Director, The Nature Conservancy's Florida and Caribbean Marine Conservation Science Centre
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China	Dr. William V. Bleisch Training Programme Development Specialist WWF-China Programme Office
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