

Project Formulation Survey  
on Biodiversity Conservation  
in Indonesia

Summary

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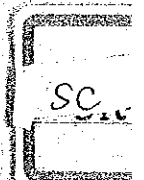
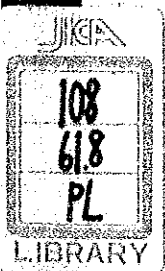
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## 1.1. Present state of biodiversity conservation in Indonesia

### (1) Overall state of biodiversity in Indonesia

Indonesia consists of more than 17,000 islands which extends about 5,100 km long from east to west, 19,000 km long south to north, and it has known to be one of the greatest biodiversity areas in the world.

Although Indonesia covers only 1.3% of the world's land surface, more than 325,000 plant and animal species have been estimated to exist. Such diversified wildlife is divided into seven biogeographical regions.

In addition to the diverse terrestrial species, the vast land water and Indo-Western Pacific Ocean embrace biodiversity richness in Indonesia. The area surrounding Sulawesi and Maluku is one of the best-known habitats for coral and fish species.

In Indonesia, biological resources have been important for economic reasons as well. More than 6,000 species of animal and plant are utilized by local dwellers for daily consumption (cultivation, farming, hunting and collecting).

It is estimated that about 40,000,000 people are depending directly on wildlife to support themselves. Those who live in rural areas in particular heavily depend on such diverse natural environment.

Thus it can be said that rich biodiversity is an important natural resource in Indonesia. Considering the fact that major industries in Indonesia (forestry, agriculture, mining, fishery and tourism) directly or indirectly depend on diversified ecosystem and its function, the conservation of biodiversity is essential for the sustainable development of the country.

### (2) Loss of biodiversity and its cause

Natural environment and species have been threatened by the rapid growth of population, abrupt land use and national development programmes. Currently, the population (40% of age under 15 and 13% of age under 5) is growing at the rate of 1.97% per year. The birth rate is high and it is estimated that the population will reach 216 million by the year 2000. The population density is not uniform throughout Indonesia but high in the Java region. The majority of the population depends on agriculture. As fertile land on Java and other islands become limited, immigration to outer islands, exploitation of forest and destruction of environment would increase.

Thus programmes (e.g. plantation) which aimed at increasing food production or decreasing human pressure have caused the clearing and reclamation of primary forests, soil erosion, soil infertility and loss of wildlife habitat.

The ecosystem of wetland and coastal areas is particularly fragile. Inland water, which is as equally important to fishery as open seas, has been also polluted by deforestation, fertilizer run-off and discharge of industrial waste.

The natural environment of coastal and tidal areas has been under severe threat from developments because of the rapid population growth that depend on natural resources for its food and living. The

main threats to the coral reef and other coastal ecosystem include flooding, siltation, over-exploitation, destructive fishery methods and dredging.

It is undeniable that the present economic policy and the use and management of natural resources have a negative impact upon the biodiversity. Intentionally controlled low timber value and the grant aids for conversion from forest to mono-cultured plantation has inflicted adverse effect on biodiversity conservation.

Some species which have already been under threats through the loss or disturbance of their habitat, are particularly sensitive to the pressures such as over exploitation and poaching.

Introduction of exotic species has also been severe threat to the survival of indigenous species. The recent policy of agriculture and land use have had adverse effect on biodiversity. The conversion into the cultivated land is not always ecologically sound practice (particularly for poor soil on outer islands).

### (3) Biodiversity conservation measures

#### 1) Legislation, policy and international cooperation

Although the Indonesian government had been known not to give a very high priority to biodiversity conservation, since the United Nations Conference on Environment and Development (Earth Summit) it has shown a positive stance to the matter.

#### 2) National system of protected areas

There are 367 protected areas in Indonesia including 25 Terrestrial National Parks and 23 Marine National Parks. Additionally 16,200,000 ha (8.2% of total land surface) of protected areas are under the process of designation. Terrestrial, coastal and marine protected areas are all representative of main natural habitats and they are distributed throughout Indonesia.

However, the majority of protected areas has been designated by documents and actual action has never followed, therefore only few protected areas have been actually being managed. It would be essential to take this into account when we consider the overall requirements for biodiversity conservation in Indonesia. Protected areas in Indonesia have been selected based upon following three criteria 1) gene pool / species loss rate 2) socio-economic reasons 3) validity of management

#### 3) Ex-situ conservation

In contrast to management of protected areas, ex-situ conservation has been well dealt with by both government and private sectors but an overall national coordination system has not yet been established. However in 1976, the Ministry of Agriculture established the national committee for genetic resources conservation. In early times the concern of the committee was limited to genetic resources of agriculturally important plant species and it has recently extended its concern to animal.

Ex-situ maintenance and management of seed banks and live specimens would require not only sophisticated techniques but also firm financial support.

However, its objectives have not been achieved due to lack of finance and manpower. Its potential as biological resources have been underestimated because of inadequate biological inventory

survey and management of biological specimen which are the most important practices in ex-situ conservation management.

#### 4) Main official organizations relating to biodiversity conservation

There are several organizations which relate to the conservation and use of biological resources. The most influential organization in in-situ conservation is the Directorate General of Forest Protection and Nature Conservation (PHPA), a directorial office which has two branches relating to protected area management.

1) Nature conservation branch is responsible for making overall policy of protected areas, establishment of conservation legislation, and the proposal, establishment and management of individual protected areas

2) National Parks and Recreation Forests branch is responsible for maintenance and management of National Parks.

On the other hand, Deputy for Natural Science of LIPI plays a major role in environmental and biodiversity project through the operations of Research and Development Centre (Puslitbangs) and Scientific Documentation and Information Centre (PDII). Four Puslitbangs (i.e. biology, oceanography, limnology, biotechnology) are in charge of the study of biological science. Botanical Garden is also responsible for the ex-situ conservation of biodiversity. All those organizations carry out scientific research and management of biological specimen.

The majority of specimens are stored in Herbarium Bogoriense and Museum Zoologicum Bogoriense, and managed by Puslitbang Biology in Bogor. Many marine specimens (mainly the crustacea and fish) have been stored, managed and studied systematically by Puslitbang Oceanologi in Ancol. The Ministry of Agriculture and Ministry of Science and Technology also play an important role in conservation of plant genetic resources.

On the other hand, National Development Planning Board (BAPPENAS) coordinate policies concerning biodiversity conservation among ministries at the planning stage and play a major role in allocating foreign grant aids. The Ministry of Environment (LH) controls and regulates any government and private enterprise which may have adverse environmental effects and act as go-between for environmental NGOs and nations.

#### 5) Budget allocation

The present budget of the Indonesian government for biodiversity conservation is insufficient. The annual budget for PHPA is estimated at about US\$ 6,000,000 (total terrestrial protected area is 16,000,000ha, therefore, the annual budget per hectare will be US\$ 0.36). This is extremely low and it is only 0.01% of total budget. Grand total together with grant aid from donors will come to about US\$ 12,000,000 (average US\$0.75 /ha/y).

It has been estimated that about US\$ 1.9 billion for in-situ conservation and US\$ 1 billion for ex-situ conservation will be required in next ten years. However the governmental budget and grant aid from donors could cover only 10 to 15% of its estimated annual budget, US\$ 2.9 million. When all listed enterprises are carried out under the Indonesia Forestry Action Programme and Biodiversity Action Plan for Indonesia, the budget would increase by up to 18 to 20%.

## 6) Non-government organizations (NGOs)

NGOs are recently playing a major role in biodiversity conservation to supplement activities of government organizations in Indonesia. It is noteworthy that since the United Nations Conference on Environment and Development (Earth Summit), the Indonesian government has encouraged organizations such as WALHI (a national environment NGO forum) to participate in policy making and carrying out biodiversity conservation projects.

## 1.2. Biodiversity Action Plan for Indonesia

The Biodiversity Action Plan for Indonesia is recognized as an official policy paper for the biodiversity conservation programme in Indonesia. Its objectives are to regulate the damage and loss of terrestrial and marine wildlife habitats such as forests, wetland and coral reefs; to collect data and information for biodiversity conservation and to encourage the use of information by policy makers; and to promote the sustainable utilization of natural resources. Main operations are as follows.

- (1) In-situ biodiversity conservation in terrestrial National Parks and other protected areas
- (2) In-situ biodiversity conservation outside terrestrial National Parks and other protected areas, e.g. forest, wetland and farmland
- (3) Biodiversity conservation in coastal areas and sea
- (4) Ex-situ Biodiversity conservation
- (5) Community involvement in biodiversity conservation
- (6) Research and development
- (7) Use and management of information
- (8) Education, training and extension programmes

## 1.3. Donors including NGOs

### (1) Global Environmental Facility

Conservation project based on Kerinci-Seblat National Park in Sumatra is now being carried out.

### (2) World Bank

Forestry I and II loan relating to protected areas have invested in management and infrastructure development /improvement of 15 National Parks. In Forestry I, Leuser, Dumoga-Bone, Baluran, Bali Barat, Bromo-Tengger National Parks have been selected. In Forestry II following ten National Parks have been selected, Gunung Gede Pangrango, Pulau Seribu(Java), Way Kambas, Bukit Barisan (Sumatra), Tanjung Puting, Kutai (Karimantan), Lore Lindu (Sulawesi), Manusela (Maluku), Wasur Teluk and Cendra-wasih(Irian Jaya).

### (3) Asian Development Bank

Biodiversity conservation projects in Flores and Siberut Islands are concerned not only with the conservation of forests and its ecosystem but also the promotion of biodiversity conservation and management.

(4) United States Agency for International Development(USAID)

USAID programmes have been carried out in two protected areas in Kayan Mentarang,(Gunung Palung and Bukit Baka) and in two sites in North Sulawesi (Gunung Tangkoko and Bunaken Islands). The programmes have been focused upon the ecology of forest and wildlife in the areas and technical and scientific knowledge both from Indonesia and the U.S. have been brought in.

(5) The Nature Conservancy (TNC)

Objectives of SSP in Lore Lindu National Park and Morowali nature reserve are to strengthen the control of protected areas by promoting public awareness of nature conservation in the boundaries between the Park and protected area and also by improving socio-economic status of the surrounding local communities.

(6) World Wide Fund for Nature(WWF)

WWF selected the sites for biodiversity conservation from each biogeographical region to set up projects. A considerable number of management plans, resource inventory, data have also contributed to the work of other organizations.

#### 1.4. Overall concept

(1) Role of Japan, United States and Indonesia

During the survey, a joint committee with Japan, the United States and Indonesia was formed and discussed the role of each country for the project. The three parties agreed that a Steering Committee consisting of representatives from each country will be established to decide its policy to run the project. Technical Committee will be formed under the Steering Committee to discuss practical activities of each project. National Biodiversity Committee will be set up as the highest decision-making body for implementing the Biodiversity Action Plan for Indonesia(a provisional Biodiversity Working Group,composed of government organization and NGO representatives who are free to express their thoughts regardless of their respective associations, has been formed and will eventually be upgraded) .

The roles of each country have been agreed as follows:

1) Japan

There are two components in the suggested cooperation programme. One is the promotion of ex-situ biodiversity conservation through scientific research programmes, the improvement of facilities and establishment of information system. The renovation of Herbarium Bogoriense is considered under this approach. Considering LIPI as the main counter-part organization, biological inventory research, sorting out of the existing specimen and information and relating scientific research are also planned. An information management system for policy makers and scientists will be established.

The other is cooperation for in-situ biodiversity conservation at protected areas and its surroundings. One or two selected National Parks will be assisted in biodiversity conservation and development, considering PHPA as a counter-part. Java island or surrounding islands are proposed as a location for the candidates.

Grant aid, project-type technical cooperation, dispatch of experts and development study are



considered as possible cooperation schemes to carry out the programme.

## 2) The United States

The United States has emphasized the idea of long-term grant aid management, and proposed the establishment of a non-profit private foundation. By placing it as an independent organization from the Indonesian government, the US intends to set up a flexible grant allocation mechanism to promote cooperation between government and NGOs. They have proposed to provide about US\$ 15,000,000 as an endowment and about US\$ 5,000,000 as running costs including technical support.

## 3) Indonesia

The Indonesian government is responsible for the remaining running costs of the proposed in-situ and ex-situ projects as local expense as well as the allocation of appropriate counter personnel.

### (2) Japan's overall cooperation to be considered

The main objective is to support and strengthen Indonesian practices for the Biodiversity Action Plan for Indonesia in various ways. As mentioned earlier, there are two components to the Japanese cooperation plan: 1) the promotion of in-situ biodiversity conservation management in National Parks and surrounding areas through scientific research, staff training, education, and infrastructure development. 2) the promotion of ex-situ biodiversity conservation through scientific research including biological inventory survey (which may lead to biological resource research), sorting out of the existing biological specimens, data management of various scientific research, infrastructure development for biological specimen management, providing hardware and software for computerizing management of biological and other relating information, and training programme.

#### 1) In-situ biodiversity conservation

##### A. Objectives

It is aimed to promote the status of National Parks and surrounding areas as the source of biological resources through adequate management and raising conservation awareness among local people.

##### B. Selection of candidate sites

In-situ candidate sites were selected at the workshop held by BAPPENAS in Puncak with participation of team members from Japan and the United States. Among 27 protected areas listed in BAPI and country study as high priority areas, the following 9 sites (5 terrestrial and 4 marine) were selected according to the criteria such as location, priority status (based on BAPI and the country study), biodiversity richness, degree of human threat, number of endemic species, area and altitude, occurrence of endangered and rare species, vegetation type, number of scientific publications by biogeographical regions and taxon, facilities, budget, number of staff, accessibility and donor support.

#### Terrestrial national parks

- a. Gunung Halimun National Park (Western Java)
- b. Meru Betiri National Park (Eastern Java)
- c. Gunung Rinjani National Park (Lombok Island, Lesser Sunda)
- d. Manusela National Park (Seram Maluku)
- e. Rawa Aopa National Park (Sulawesi)

#### Marine national parks

- f. Kepulauan Seribu Marine National Park (Java)
- g. Karimun Jawa Marine National Park (Java)
- h. Taka Bone Rate Marine National Park (Sulawesi)
- i. Cendrawasih Marine National Park (Irian Jaya)

Furthermore, in due consideration of the site significance as the pilot project, 3 terrestrial sites (Gn.Halimun, Meru Betiri, Rinjani) and 2 marine sites (Kep. Seribu and Karimun Jawa) on and around Java Island were finally selected.

#### a. Terrestrial national parks

##### \* Gunung Halimun National Park

Gunung Halimun National Park is the most recently declared National Park in Indonesia designated in 1992. The Park is 40,000ha in size of which most of area is covered by lowland rain forest. It is situated around Mt. Halimun (altitude 1,929m) at about 20 km south west of Bogor. It is managed under the same administration with the adjacent Gunung Gede Pangrango National Park, though actual management is not taking place. Characteristically the park contains the largest area of primary lowland rain forest remaining in Java. The park is poorly described in scientific papers compared to the neighbouring Gunung Gede Pangrango National Park. There are tea estates since the Dutch occupation within the park boundaries and its peripheries, which may make park management more difficult. Small scale gold mining industries are also present in the western and northeastern part of the park.

##### \* Meru Betiri National Park

Meru Betiri National Park was designated as a National Park in 1982. The park is located in south east Java and is approximately 58,000ha in size. Altitudes range from sea level on the coast to 1,223m on Mt. Betiri. Dominant vegetation types are monsoon forest, mangrove, coastal vegetation with some small areas of lowland rain forest. Visitor centres (not functional) and research facilities are concentrated in the coastal areas and which are known for sea turtle breeding sites. A native plant species, Java Long Pepper (*Piper Retrofractum*), locally known as Cabe Jawa, has been used as medicine called Jamu. Park staff have been carrying out small-scale cultivation experiments to investigate high yield variations of the plant for maximum income source.

##### \* Gunung Rinjani National Park

The park is about 41,000ha in size and covering Mt. Rinjani (3,726m, the highest volcano in Indonesia) which is located at the centre of Lombok island east to Bali. The park is important not only for biogeographically characteristic wildlife but also as a catchment area for surrounding

agricultural land. Nusa Tenggara region, in which Lombok is included, is classified as monsoon region and tropical semi-evergreen forest is dominant. The park is under the management of Sub-Balai (regional office of Ministry of Forestry) Nusa Tenggara Barat, which is located in Mataram, capital city of Lombok island. The main tasks are patrolling for illegal activities such as wood poaching, together with promoting conservation awareness among local people.

Vegetation survey and ecological survey of animals have been carried out within limited areas. Recent tourism development triggered the infrastructure development and resulted in the good conditioned road reaching to the park entrance. The park is expected to function as a centre for recreational purposes.

#### b. Marine national park

##### \* Kepulauan Seribu Marine National Park

The park consists of 73 islands (out of 108 Seribu Islands) and located north of Jakarta Bay. All islands are originated as coral reef and all of them are less than 3m above sea level. Although the area was designated as National Park in 1982, it has been suffering from excessive recreational use and water pollution as a result of its proximity to the capital city. The park is presently listed in the IUCN as an endangered protected area. The whole park is divided into 3 areas for management purposes. The park is also classified into 4 zones according to degree of permitted activities, i.e. sanctuary, protection, intensive use and buffer zones. The staff spend most of their time patrolling the sanctuary zone for illegal activities, and adequate management practices covering the whole area has yet to be done. There is a visitor centre on Pramuka island, at the entrance of the park, and this is used for staff training and public information centre.

#### D. Expected cooperation contents (counter-part organization : PHPA)

- \* Management, planning and implementation of management practices within the subjected site
- \* Planning and conducting long-term in-situ biological inventory survey
- \* Establishment of training programmes of park staff and other persons relating to biological inventory
- \* Establishment of ecological study and wildlife habitat research for conservation, and monitoring techniques and system for in-situ conservation management.
- \* Implementation of development study in protected areas and the surroundings
- \* Planning and partial implementation of infrastructure development for appropriate management of protected areas

#### 2) Ex-situ biodiversity conservation

##### A. Objective

The main objective is to promote the accessible information of biological resources in Indonesia for planner and researcher through biological inventory survey and up-dated data management of biological specimen.

## B. Current situation and problem

### \* Biological inventory research and its functions

Inventory research requires skilled scientists and technicians for identification, and should focus on species which possess potential scientific and economic value. At present, there are only few biologists who specialize in taxonomy in Indonesia. This has been the main limiting factor to carry out inventory research. Thus it is an urgent task for LIPI to employ and train more taxonomists. Although scientific knowledge at the university level will be required to carry out taxonomic research per se, some taxonomic surveys can be conducted by those who have not studied science academically, as exemplified in the successful sample in Costa Rica. Thus it may be most appropriate and also economical to train Indonesian field collectors as many as possible to supplement university graduated scientists.

A great number of trained staff will be required to maintain and manage the existing and newly added specimen. In Indonesia, the management of herbarium and zoological museums have not been well recognized for a long time. As a result, the present management and maintenance of specimen is under poor condition.

Overall biological inventory survey and monitoring practices would require official administration. Therefore, national cooperation is necessary among all government agencies relating to environment (e.g. LIPI, Ministry of Forestry, BAPPENAS, Ministry of Environment, Ministry of Education and Culture, Ministry of Agriculture and BAKOSURTANAL, etc.)

### b. Research environment for biological inventory survey

There is a shortage of equipment to effectively sort out and manage data for biological inventory research. At present, computers, preferably linked with LAN technology, are urgently required to computerize existing specimen data and to register new specimens using efficient techniques such as bar codes, to manage specimen data efficiently and to loan or exchange scientific data to other organizations. It has become the most serious problem for taxonomists not being able to obtain updated scientific information to carry out their own independent research. Access to inter-net would enable Indonesian scientists to specify the source of potentially useful information by searching biogeographical data base on line computer system.

At present, specimens are stored under inappropriate conditions. Many specimens both at herbarium and zoological museums are under severe threats due to poor quality of preservation facilities and conditions.

Marine specimens are stored separately at the zoological museum in Bogor, head of marine research (Ancol), and Anbon (Maluku Islands), but it would be ideal to store and manage them at one place from the taxonomic research and biodiversity information management points of view.

### \* National biodiversity information network system

There has been a growing demand for the biodiversity information among Indonesian government policy making people, natural resources manager, government and private researchers.

To meet the demand, it will be necessary to have national information management system to put together other various information such as socio-economic aspects, environment and land use. A

successful biodiversity information management system depends on how efficient and accurate information can be provided.

The majority of biodiversity information of little known tropical fauna and flora has derived from collection of specimen and study of preserved specimen. Furthermore, most of them require new scientific name and description before transferring to the adequate condition. Thus collection of specimen identification and mapping of origin would become very important. For such reason, the proposed system needs the flexibility of electronic linkage among species based data, specimen based data and other reliable relative record for species identification.

The Geographic Information System (GIS) is a useful tool to visually display, monitor, as well as to model specimen distribution and other related information by storing and analyzing a wide variety of information. It uses information such as population, socio economic status, climate, aerial photos, remote sensing data, geography, soil, geology and land use information recorded and managed in text, vector and raster form, and can also relate to non-environmental information.

However, it is impossible to obtain all such variety of data from a single organization in Indonesia. It is also unrealistic to expect only one organization to manage and update such massive data. For this reason, a national biodiversity information management system requires active cooperation among Indonesian government organizations (BAPPENAS, BAKOSURTANAL, PHPA, LIPI ,etc).

The proposed information system by the Indonesian government is to network all organizations. Provisional intra-government consensus was obtained in November 1991, information from selected sources will be put together, analyzed and provided to people through electronic terminals and hard copies. As regulating organization for the network, LIPI will be responsible for such operation.

C. Expected cooperation contents (LIPI, as a counter-part organization, and Jakarta and Bogor as proposed sites )

- \* Short-term biological inventory survey at the priority sites in terms of biogeography in Indonesia
- \* Collection, sorting, management and research of existing and new biological specimens.
- \* Management of information from biological specimen and other sources (including documents), and programme design
- \* Planning, coordination and implementation of surveys and research, and training programme
- \* Renovation or reconstruction of herbarium
- \* Providing support for the establishment of biodiversity information management system (providing hardware and software)

3) Japan's cooperation schemes

A. Grant aid

Japan has given consideration to give grant aid to provide hardware and software for the set up of the national biodiversity information management system and also for the extension or renovation of the Herbarium(Bogor) and facilities in one or two National Parks.

The site has not yet been selected. One of the prime candidates Gn.Halimun National Park has recently been given its status and there would be a possibility of constructing an administration office and biological station with basic laboratory functions for research and training.

Japanese side has already announced the amount of total grant, ¥1 to 1.5 billion , to the project. The definite contents and items of expenses are being examined by Indonesian experts and due to be concluded by the end of August.

#### B. Project-type technical cooperation

Initially, in-situ and ex-situ conservation projects were considered to be separately implemented as independent projects. However, since the proposed sites of the former project , Gn.Halimun National Park and Kepulauan Seribu Marine National Park are located close to the latter proposed areas, Bogor and Jakarta, it should be studied that two projects will be implemented with close coordination for the effective conservation management. PHPA and LIPI are responsible for in-situ and ex-situ conservation respectively and their active cooperation is indispensable.

Technical cooperation for in-situ and ex-situ conservation may cover the following fields.

In-situ conservation:	natural environment management, forest ( plant) ecology, animal ( mammal ) ecology, environment education, rural-sociology or anthropology, watershed conservation, buffer zone / land use
Ex-situ conservation	planning and coordination of research and training, herbarium specimen management, zoological specimen management, biological information management botany (taxonomy), zoology (entomology, ichthyology, ornithology, herpetology, mammalogy ,etc.) marine biology, and microbiology

#### C. Development Study

Gn. Halimun National Park, a prime candidate for in-situ conservation cooperation measure, was designated as National Park last year. The park therefore still requires basic management such as setting boundaries of park and planning for park management and its appropriate use (including infrastructure development). At the same time biological inventory survey to define its potentials and function as holdings of biological resource as well as map information for long-term park management would be urgently required. Furthermore, it is essential for in-situ conservation and development to produce land use management plan in order to establish buffer zone at the area adjacent to the park, through the surveys of public impacts, which include population dynamics of adjacent area, degree of the use of natural resources and other factors.

Ideally, in-situ conservation should be implemented after achievement of above mentioned subjects. However, due to the schedule, other cooperation schemes are being carried out first.

#### Main items of development study (example)

- 1) Vegetation and land use mapping by remote sensing or aerial photograph
- 2) Boundary survey
- 3) Survey of geology and hydrology
- 4) Zoning according to conservation priority
- 5) Management and use plan ( including infrastructure development ).
- 6) Supplemental ecological research

- 7) Nutrition survey and population dynamics research
- 8) Socio-economic research

#### 4) Considerations and challenges for the future

##### A. Choosing software for information management

Indonesian experts have been examining which system and software are most appropriate and they will let us know by July. A seminar will be held at the middle of June to analyze the details of selected software. We will observe the seminar and shall obtain information of systems in advance and prepare ourselves to give some advice to official request from Indonesia.

##### B. Extension, renovation and construction of facilities

We have given consideration to provide grant aid for the extension and renovation of herbarium together with information system and construction of small-scale facilities in selected National Parks. However, as far as renovation of existing facilities is concerned, we need to examine if Indonesian requests are appropriate.

Thus we need to clarify if renovation is technically possible and if it is appropriate in terms of facility requirement. Indonesian experts have been examining the matter and an alternative plan and proposal may require to be produced depending on the results. If the request is to build a new facility, allocation of grant aid to other scheme would be affected since the amount of grant available is limited in itself. In this case, the present plan may be amended. Construction of new facilities in protected areas need to be planned carefully and the building needs to complement the characteristics of background environment.

##### C. Refinement of concepts of the U.S. foundation

Although the establishment of the foundation has been agreed by Indonesia, definite plans have not yet been fully comprehended. A seminar will be held in June to promote better understanding of its concepts. We should pay close attention to the seminar and future development in this matter.

We will strongly recommend that local expense should not exceed the original budget. We need to take the following measures into account, preferential grants to experienced NGOs for in-situ conservation, possibility of the use of biodiversity Foundation proposed by the U.S., funds for sustainable development of United Nations Development Programme (UNDP) and possibility of international organization cooperation.

##### E. Necessity of cooperation with NGOs

We have limited schemes to directly support NGOs. However, we should work cooperatively with international or national NGOs experienced in conservation of protected areas or their surroundings.

##### F. Intellectual property rights

It is important to recognize among three countries, Japan, the U.S. Indonesia, that all biological resources and its by-products relating the project belong to Indonesia. We did not reach any official

international agreement during the project planning stage, and security measures need to be discussed in due course.

### (3) Tentative schedule for future cooperation

Cooperation schemes and contents for the Biodiversity Conservation Project under consideration by the Japanese side have already been mentioned in the earlier part of the report. The tentative schedule for each cooperation scheme are considered as follows:

#### 1) Grant Aid

The government of Indonesia has already submitted the official proposal for the fiscal year 1994, concerning the database network system on biodiversity conservation, but this did not contain the construction of the administration office for the national park, or the renovation of the Herbarium. A new unofficial proposal was submitted in July which contained these components, but the grand total amounts to ¥3.2 billion was expensive. Furthermore, the necessity of the facilities and machines described in the new proposal is not clear. Indonesian experts have been examining an alternative proposal.

An official proposal that clarify the necessity of the facilities should be submitted before a JICA survey mission is dispatched. A study on which type of software will be necessary for the project should also be conducted by the Government of Indonesia before dispatching the mission.

#### 2) Dispatch of the Expert

With regard to the expert for ex-situ conservation, it is required that the Government of Indonesia first submit a proposal by the end of September.

It is planned that a long-term expert (24m/m) concerning in-situ conservation to the Ministry of Forestry will be dispatched this year. The Government of Indonesia must submit an official proposal as soon as possible to enable the dispatch of this long-term expert.

#### 3) Project-type Technical Cooperation

A non-profit private foundation, a major component of U.S. cooperation, is expected to be initiated during the fiscal year 1995. It is desirable that project-type technical cooperation, one of the major components of Japanese cooperation, be set up during the same fiscal year in the light of the fact that the programme is part of Japan-U.S. collaboration for biodiversity conservation in Indonesia.

In order to set up the Project-type Technical Cooperation during the fiscal year 1995, it is essential that the GOI submit a proposal by October 1993 for the consideration of the preliminary survey during FY 1994 by the Japanese side.

The Project-type Technical Cooperation is expected to contain both in-situ and ex-situ programmes. It is therefore necessary for the two major counterparts of each programme, LIPI and PHPA to have close contact with each other in finalizing the TOR. It is crucial that BAPPENAS, acting as a coordinating agency in the programme also keep in close contact with these two bodies.



#### 4) Development Study

It is best to conduct a development study for the formulation of a master plan for the National Park management and land use before other schemes of technical cooperation are initiated. Although in this case the Development Study will be conducted at a relatively late stage, this must not be overlooked in view of the fact that the Master Plan will be necessary for the appropriate management of relevant areas.

It is necessary for the Government of Indonesia to submit a request for Development Study for the FY 1994 to enable the Japanese side to select the project and dispatch a preliminary mission in the latter part of the FY 1994.

#### 5) Miscellaneous

The so-called Project Formulation Survey mission is scheduled for dispatch at the end of the FY 1993 in order to confirm the progress of the establishment of the Foundation by the U.S., and to what extent the Indonesian side is prepared for the project implementation.

In addition, JICA Indonesia Office is now employing a local technical advisor from July to November in order to collect and analyze information on biodiversity conservation and the environment in general.

The biodiversity conservation project is a combination of different cooperation schemes such as dispatch of experts, grant aid, project-type technical cooperation, and development study. These schemes need to be integrated in order to approach the goals. For this purpose, the dispatch of a chief technical advisor, who will supervise and coordinate all cooperation activities, should be considered.

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