

**DEVELOPMENT OF LANJAK ENTIMAU  
WILDLIFE SANCTUARY  
AS A TOTALLY PROTECTED AREA, PHASE II**

**Project PD 15/95 Rev.3(F)**

**Project Completion Report**



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March 2000

## PROJECT COMPLETION REPORT

### A. Project Identification

(a) Title	Development of Lanjak Entimau Wildlife Sanctuary as a Totally Protected Area, Phase II
(b) Serial No.	PD 15/95 Rev.3(F)
(c) Executing Agency	Forest Department, Sarawak, Malaysia
(d) Host Government	Government of Malaysia
(e) Starting Date	1 April 1997
(f) Project Duration	24 months
(g) Actual Project Cost	US\$2,784,720

## PART I – EXECUTIVE SUMMARY

### 1. Background Information

#### (i) Key Problems

One of the conclusions made by the 1990 ITTO Mission to Sarawak was the need for biodiversity conservation in view of the fast dwindling natural forest resources. This conservation would be best served through the *in situ* preservation of the State's natural heritage.

In responding to the Mission's report recommendations, the Lanjak Entimau Wildlife Sanctuary (LEWS) Sarawak's largest Wildlife Sanctuary covering an area of 168,758 hectares, was selected by the Sarawak Government for management as a Totally Protected Area (TPA). The Sanctuary contains at least eight different forest types found in inland Sarawak.

LEWS was gazetted primarily for the protection of the largest orangutan population in Sarawak. Long before becoming a TPA, its socio-economic importance was realised as more than 12,400 people of the Iban community in 104 longhouses reside in the periphery. Many of these people are still dependent on the forest and its resources for livelihood as their ancestors have done for

many generations. Recognising the need, the Sarawak Government has granted them special privileges to hunt and collect timber and jungle produce in the Sanctuary for their own subsistence, but not for commercial purposes. A number of timber companies are located just outside the Sanctuary boundary.

The key problems to be addressed are:-

- a) protection of the Sanctuary from encroachment or other illegal activities such as poaching;
- b) ensuring the survival of the complex biodiversity of the Sanctuary;
- c) ensuring local communities benefit from development of the Sanctuary's biodiversity resources.

#### **(ii) Specific Objectives and Outputs**

Research and development were planned with the dual purpose of biodiversity conservation and sustainable use to benefit the local communities who will still be dependent on the forest for at least another generation. Practical training in activities relating to biodiversity conservation, management and community-oriented development was also emphasized.

The Sanctuary's protection would be effected through sustainable utilization of its resources in the buffer zone. To ensure effective management, infrastructure in the form of a headquarters, ranger stations and sub-camps were provided. Strategies for long-term planning, research and management have been outlined in the Management Plan.

#### **(iii) Project Strategy**

The strategy adopted covered the technical and scientific, economic and social, environmental and managerial aspects of sustainable resource development. The technical and scientific aspect placed emphasis on research, biological inventories and training. The socio-economic aspects looked into the selection and utilization of the Sanctuary's plant and animal resources to benefit the local communities.

The environmental aspects ensured the preservation of forested habitats for the maintenance of the rich and diverse biological resources. This included a trans-boundary co-management proposal with the Betung Kerihun National Park in West Kalimantan.

The managerial aspects emphasized the need for adequate training among the Sarawak Forest Department staff for TPA management and decision-making. Training also involved the local communities to prepare them for direct participation in the co-management of the Sanctuary.

## **2. Project Achievements**

### **2.1 Outputs and specific objectives achieved**

In compliance with the specific objectives the Project concentrated in the following four areas of development:

#### **(i) Infrastructure to provide facilities**

The facilities included a Sanctuary headquarters, a field station with laboratory facilities, two ranger stations, twelve sub-camps along strategic locations of the boundary and two climatological and hydrometric stations.

**(ii) Management guidelines** on priorities for biodiversity inventories and ecological studies, and identification of areas in the buffer zones for community-based biodiversity resource development of projects were given in the Project Final Report.

**(iii) Research** to collect information on climatic and hydrological data, floral and mycological inventories, uses of floral and faunal species for medicinal or other traditional use, faunal inventories involving small mammals and insects, distribution and populations of rare or threatened species, and biotic compounds and their origin had been largely completed.

**(iv) Training** all participants from the Forest Department and local communities on various aspects relating to biodiversity conservation and community development was carried out.

## **3. Target Beneficiaries Involvement**

The 1990 ITTO Mission made a significant contribution to Sarawak biodiversity conservation by recommending Lanjak Entimau Wildlife Sanctuary to be managed as a TPA. The resources from this TPA will serve the future needs of the people of Sarawak and Malaysia.

The Sanctuary also plays a critical role in conservation as a part of the Trans-boundary Conservation Area with Kalimantan's Betung Kerihun National Park.

The Sarawak Forest Department has directly benefited from the Project through the involvement of its officers as counterparts, part-time consultants and research assistants in the various fields. Two senior wildlife officers participated in the Project as part-time consultants. These officers are also directly responsible for the Sanctuary's management. A number of research assistants with the Project have been posted to take charge of the temporary headquarters and ranger stations.

The Project has helped to accumulate for the first time a tremendous amount of data and information on biodiversity necessary for the long-term management of the Sanctuary in particular, and the Trans-boundary Conservation Area in general.

A direct benefit of the Project is providing employment to the local communities at three ranger stations and during many field trips. Many were engaged as labourers and boat hands. Many in the Ulu Katibas area were given employment of up to three months during the 1997 ITTO Borneo Biodiversity Expedition.

Residents from three longhouses can begin to reap their first harvest of fish reared in the two valley ponds and one concrete tank in 2000. Eleven households participated in the planting of indigenous crops comprising popular fruit trees and vegetables that will provide them with additional short-term and long-term cash income through the sale of the products.

#### **4. Lessons Learned**

##### **(a) Development Lessons**

The conservation value of Lanjak Entimau Wildlife Sanctuary lies in its great diversities of plant and animal species. These diversities are closely associated with a wide range of inland habitats from just above sea level to 1,285 metres.

In order to assemble a good baseline data that would effectively describes the Sanctuary's biological diversity, floral and faunal inventories had to be designed to cover the full range of habitats. Species diversity, distribution and population were seen to be closely associated with habitat changes.

The inventories have established a major part of the buffer zone and the wilderness zone as having the richest habitats for flora and fauna. These habitats are also most prone to human disturbance. A number of sensitive areas have been identified as special protection zones. Re-zoning of the Sanctuary was carried out.

For Lanjak Entimau, as in other TPAs with a high concentration of rural populations, any strategy in conservation to ensure effective and successful long-term management of biological resources must involve the participation of the local communities. This is because the local people are still very much dependent on many of the Sanctuary's plant and animal resources for their livelihood.

It was important to work closely with the Executing Agency, the Forest Department in initial planning, determining guidelines for management and ensuring that natural resource management and interest of the local communities are sustained. One of the problems faced by the Forest Department is the shortage of professional and technical staff. This problem will gradually be solved when the Department's corporatisation programme is fully implemented.

In view of the need to involve the local communities in resource management, suitable candidates were identified for on-the-job training appropriate to the Forest Department's long-term development programme. Trained candidates who have been recruited to work in the ranger stations form a vital link between the Department and the local communities in the development process.

The community development projects, apart from assisting the local residents in achieving extra cash income, are also a strategy to ensure adequate protection of the resources in the buffer zone and wilderness zone from constant human exploitation. One difficulty encountered in the project implementation was the reluctance of the local people to participate in communal activities but instead preferred to work on an individual household basis. While this was possible with indigenous crops planting in individually owned farms, fish rearing needed to be developed on a shared basis so as to extend the benefits to all the longhouse residents.

One important problem that still needs to be contained is illegal hunting and poaching from non-local residents, i.e. those who live far away from the Sanctuary. A positive development is the ban on the sale of wild meat under the new Wild Life Protection Ordinance (1990). The cutting of the 164-metre long boundary to a width of five metres would also help. Sub-ranger stations and sub-camps are provided for more effective patrolling and enforcement duties. Rural education programme by the Forest Department continues.

## **(b) Operational Lessons**

- **Programme organization and management**

Early programme organisation was made with the preparation of a workplan and proposal by each consultant. The proposal included schedules for field work.

Programme organization was critical in view of the tight work schedule. Each consultant had only six person-months to complete his or her study and produce a final report. Areas for field work were identified. The timing and amount of field work needed were determined in order to produce the desired results.

After a field work was planned, an advance party led by a research assistant or wildlife ranger would be sent to the field one or two days earlier to organise labour and transport, and to wait for the main party to arrive a day or two later. This way any delay would be avoided.

To assist smooth implementation of the Project, the Executing Agency posted trained local staff in the field stations to help coordinate activities in the field.

All field surveys with the exceptions of fish and reptiles and amphibians were made to cover as many of the major forest types as possible. This was to collect information on species diversity and distribution in relation to the different forest habitats. The studies have revealed that forests such as the alluvial forest and lowland dipterocarp forests are the most important habitats for flora and fauna, numerous species of plants, insects, small mammals and birds.

Management of the Project would not have been as effective if the Forest Department did not provide the ranger stations and station wildlife rangers in the field.

- **Project documentation**

Individual consultants had submitted reports of their respective studies. Apart from describing the results, each report also contained recommendations or suggestions on future research and development needs. A general conclusion was reached that LEWS has tremendous potential for research into the interior region of the Sanctuary so that its full development potential can be realised.

- **Monitoring and evaluation quality of project planning**

The project's progress was monitored by the ITTO through the Project Steering Committee Meetings attended by the Projects Manager. The Project Leader was responsible for ensuring that all the field activities were carried out according to approved schedules. Project evaluation was carried out by the ITTO and the Sarawak Forest Department according to existing policies to determine the needs for the Sanctuary's protection and development.

The quality of project planning was reflected in the smooth implementation of the field programmes and collection of useful baseline data on flora and fauna. This would not have been possible without careful project planning.

## **5. Recommendations**

The project would not have been successfully implemented without the support of the Forest Department and its many staff, particularly those from the Divisions of National Parks and Wildlife and Forest Research. It is important that the Forest Department continue to be the Executing Agency as they are also responsible for looking after all the wildlife sanctuaries and national parks in the State.

The project should continue to recommend consultants who were not only qualified but who must also possess the necessary field experience and knowledge. At the same time, it is also desirable that the Executing Agency make available a core group of counterparts and research assistants who are able to devote more time to the project. In order to achieve this, more officers need to be recruited and attached to the project for on-the-job training. It is also recommended that qualified officers be given the opportunity to do post-graduate courses and undertake field work during their attachment. More technical officers are recommended in order to fill the needs of the expanding field activities and to take charge of new ranger stations that are being put up. It is the responsibility of the Executing Agency to ensure the sustainability of the project after its completion.

The Forest Department will be responsible for much of the research that still needs to be undertaken in the areas of the Sanctuary. Guidelines for strengthening ecological studies and biological inventories have been given in the Final Report. Such studies should be extended to other areas in the wilderness zones and part of the core zones as well as in the Batang Ai National Park adjacent to the Sanctuary. Plans for field work can be included in the Department's annual field programmes on flora and fauna as had been done in the past.



It is recommended that the construction of infrastructure be speeded up although it is realised that much of the delay is through no fault of the Executing Agency. The high costs of river transport and construction due to difficult access and the unpredictable weather conditions are factors often beyond one's control. One way to overcome these problems is to authorise the Executing Agency to directly undertake the works as they are familiar with the field conditions and can better obtain the support of the local communities in transportation and construction.

## **PART II – MAIN TEXT**

### **1. Project Content**

The location of the project is the Lanjak Entimau Wildlife Sanctuary, located in south-western Sarawak between 111° 53' E to 112° 28½' E and 1° 19' N to 1° 51' N. Much of the study was conducted in parts of the wilderness zone, core zone and buffer zone. The revised core zone in the southern part of the Sanctuary contains all the eight forest types found. This is an important site for studies on species richness and distribution in relation to forest types.

Phase I began with studies on the forest types and inventories of reptiles and amphibians, primates and birds. Other activities included a survey of plants of ethnobotanical value and socio-economics of the local communities.

The results from Phase I were used in the preparation of a Management Plan for the Sanctuary. Phase II implemented the recommendations of the Management Plan relating to continuing inventory of biological resources, community-oriented activities and training to improve the knowledge and skills of both officers of the Forest Department and the local communities.

Phase II was approved with the following objectives:-

#### **1.1 Development Objective**

Formulation of policies, strategies and procedures for the development of Lanjak Entimau Wildlife Sanctuary to serve as a model in the conservation, protection and scientific utilisation of other Totally Protected Areas in Sarawak and Malaysia.

##### **Specific Objective 1**

To conserve the Lanjak Entimau Wildlife Sanctuary through a locally based programme of research into its biological diversity and other aspects of its living resources.

##### **Specific Objective 2**

Establish protection programmes for the Sanctuary through community consultation and community-oriented biodiversity resource development in the surrounding Buffer Zone.

The outputs for Phase II were :-

(a) Infrastructure:

- (i) A permanent Sanctuary headquarters;
- (ii) A permanent field station laboratory;
- (iii) Two ranger stations;
- (iv) Twelve sub-camps;
- (v) Two climatology and hydrometric stations
- (vi) Two designated seed sources or genebanks

(b) Management Guidelines

- (i) Priorities for biodiversity inventories;
- (ii) Priorities for ecological studies;
- (iii) Identification of areas in the Buffer Zone for community-based biodiversity resource development projects.

(c) Training

- (i) Participating (“on the job”) technical training for rangers, forest guards and local community residents on experimental design, the use of taxonomic keys and scientific instrumentation;
- (ii) Scientific and biological conservation courses (flora & fauna, ecology, laws) for local community leaders and residents;
- (iii) Training of local secondary and tertiary students in biodiversity (flora and fauna) and in scientific research techniques\*;
- (iv) Interpretive and educational training materials for local residents and general public;
- (v) Audio-visual documentation of biodiversity for scientific or office use.

\* i.e. training as “parataxonomists”

(d) Research

Data bases on :-

- (i) Climatic and hydrological data;
- (ii) Floral and mycological inventories;
- (iii) Floral (and faunal) species of medicinal and pharmacological significance or other traditional use;

- (iv) Faunal inventories (small inventories and insects) for understanding of the forest community as well as for conservation and management purposes;
- (v) Distributions and populations of rare or threatened species for the purpose of conservation and management;
- (vi) Bioactive compounds and their origin (species, distribution, type of effect on utility, etc.) to be used in negotiating agreements with companies or corporations interested in their medical, pharmaceutical or other application.

The activities were as follows:-

**(a) Infrastructure**

Construction of Sanctuary headquarters, field station, laboratory, ranger stations, sub-camps and climatological and hydrological stations.

**(b) Research and development with emphasis on species inventory**

- (i) Flora of vascular plants
- (ii) Mycology (fungi and lichens)
- (iii) Ethnobotany
- (iv) Genebank establishment
- (v) Insects
- (vi) Small mammals
- (vii) Reptiles and amphibians
- (viii) Fish

**(c) Community development**

- (i) Cultivation of indigenous crops
- (ii) Rearing of indigenous fish
- (iii) Game management

The project strategy ensured that various aspects of the study were covered. The technical and scientific aspects provided baseline data of the Sanctuary's resources for effective planning and development. Data were allocated through an intensive inventory programme covering a full range of the habitats.

The social and economic aspects constituted an important strategy since over 12,400 Iban people reside in the periphery of the Sanctuary. For many generations, these people have been dependent on the Sanctuary's resources for food, materials and cash income. Due to their impact no protection and development programmes can be effective without their direct participation in management. The broadened concept of sustainable development also takes into

account the benefits that the local communities can derive from the utilization of selected resources.

Preservation of forested areas and habitats ensured a sound environment and good species survival. Protection is effected through a system of zoning. Infrastructural facilities and community-oriented resource development are allowed only in the Buffer Zone and a part of the Wilderness Zone. The central Core Zone is reserved for total protection and research. The Sanctuary's boundary had recently been cut to 5 meters in width. It serves as a physical reminder to unauthorised persons who engage in illegal activities inside the TPA. Close communication links will be sought with the management authority of Betung Kerihun National Park on protection and exchange of important information on biodiversity, scientific and technical research programmes.

Development of the Sanctuary to achieve sustainable use of its selected resources had been emphasized. Through the Project, practical training was given to all participating scientific and technical officers and local community members. The National Parks and Wildlife Protection Ordinances had been recently revised to provide for a joint management system where the local communities would be consulted and directly involved in future development programmes.

The following policies and procedures developed from implementation of Phase II can be suitably applied to the protected areas in Sarawak.

- (a) Strengthening protection through providing more ranger stations and sub-camps and posting of more wildlife rangers to carry out enforcement duties;
- (b) Cutting and maintenance of boundaries;
- (c) Through an intensive research programme collect accurate baseline data and information on biodiversity resources and their potential uses;
- (d) Fully exploiting the potential of protected areas as gene pools for permanent seed production in sustainable forest development;
- (e) Reducing the local community's dependence on the natural resources by assisting them in the selection and cultivation of suitable plants and rearing of animal species to improve their income and livelihood.

## **1.2 Work Plan**

The work plan was organised according to activities scheduled for implementation within a period of 24 months beginning from April 1997. Altogether 15 months were allocated for the construction of infrastructure for which the Forest Department (Executing Agency) was responsible. The activities under Research and Development and Community Development and training were scheduled for implementation beginning from the second half of year one.

The work plan had to be revised due to a number of reasons including the 1997 haze caused by the Indonesian forest fires, the dry weather in 1997 followed by heavy rain in 1998, and the introduction of the sub-project on the ITTO Borneo Biodiversity Expedition 1997 (IBBE 1997). Employment of consultants had to be adjusted as not all the consultants were available at the beginning.

Each of the activities under Research and Development and Community Development was given six months to complete field work, specimen identification and preparation of the final report. Field travel was time-consuming in view of the remoteness of the study sites, accessible only by longboats through numerous rapids and walking. Each activity had to be carefully planned to avoid unnecessary delay.

In spite of re-scheduling of the work plan and delays due to weather conditions and other factors all activities were completed and the desired results achieved.

## **1.3 Inputs**

Inputs were provided by ITTO and the Malaysian Government based on the approved activities or outputs. ITTO's contribution amounted to US\$1,261,780 while the Malaysian contribution was RM2,446,650. The ITTO fund was used mainly for the payment of consultants and local staff, purchase of equipment and special supplies, international travels and report writing. The Malaysian contribution was spent on infrastructure, salaries, transportation, provision of equipment and general operating costs.

In conjunction with the 1997 Borneo Biodiversity Expedition, ITTO provided an additional sum of US\$144,942.00 as a sub-project of PD 15/95 Rev.3(F).

## **1.4 Project Rationale**

Following the 1990 ITTO Mission's recommendation to establish LEWS as a Totally Protected Area for biodiversity conservation, the Sarawak Government made a counter proposal to ITTO to assist in research and development activities so that the full potential of the TPA could be fully realised.

With its full range of inland forest habitats supporting an extremely rich genetic resources, the Sanctuary had the potential to contribute to sustainable forest development in Sarawak in a significant way. LEWS is also strategically linked to the socio-economic well-being of the 12,400 local Iban people who have for many generations directly or indirectly depended on the forest and its natural resources for survival. Their activities and the activities of timber contractors outside the buffer zone can threaten the survival of the complex biodiversity.

The project addressed a number of urgent issues relating to protection of biological resources and their habitats and the increasing benefits that the local communities could derive through proper use of resources. A series of biological resource inventories were undertaken to collect baseline data for the Sanctuary's management, and to determine the use of selected plant and animal species through a community-oriented programme.

The Sanctuary is contiguous with the much larger Betung Kerihun N.P. in West Kalimantan. The potential contribution of this Trans-boundary Conservation Area of one million hectares to the future well-being and many needs of human kind is tremendous and warrants continuous support from international agencies.

## **1.5 Relevance to ITTO**

As described in the Project Proposal the Project is relevant to ITTO in the following ways:-

### **1.5.1 Compliance with ITTO objectives**

This project proposal meets the following Objectives of Articles I of the International Tropical Timber Agreement, 1983 (ITTA):-

- (c) To help research and development which will improve forest management (Output 3)
- (f) To encourage tropical timber reforestation and forest management (Outputs 3 and 4)
- (h) To encourage national policies which aim at sustainable use and conservation of tropical forests and their genetic resources, and at maintaining the ecological balance in the regions concerned. (Outputs 3 and 4).

### **1.5.2 Compliance with ITTO Criteria**

The project relates to four areas, including natural forest management, reforestation development, training of technical personnel, and institutional framework and national planning.

Conformation to the ITTO criteria involves:

- (a) Improvement of forest management by research into the composition and ecology of natural forest and comparison with harvested forests (Output 3);
- (b) Reforestation development by protection and monitoring of regenerating forest in areas previously under shifting agriculture and encouraging sustainable use of non-timber forest products (Output 3);
- (c) Training of Sarawak Forest Department staff particularly those of the National Parks and Wildlife Office (NPWO) through active participation in fieldwork conducted by international and local consultants to acquire skills in data collection and analysis, and preparation of reports or presentations (Output 4);
- (d) Contribution to institutional framework and national planning by setting up a model management structure for Totally Protected Areas, for application elsewhere in Sarawak and for use in future planning (Output 2).

### **1.5.3 Relationship to ITTO Libreville Action Plan 1998 to 2001**

The project meets Action Plan Goals for the Committee on Reforestation and Management:

- Goal 1 : Support activities to secure the typical timber resource base
- Goal 2 : Improve the tropical timber resource base
- Goal 3 : Enhance technical, financial and human capacities to manage the tropical timber resource base

## **2. Project Context**

Forestry is a state matter in Malaysia. Large areas of production forests are located in Sarawak. Timber is an important backbone of Sarawak after petroleum and petroleum products. Large areas have been set aside for sustainable timber



production. The need for environmental protection is also an important national forest policy. In Sarawak, the Forest Policy of 1954 spelt out the need to reserve permanently for the benefits of the present and future generations forest land sufficient for the assurance of sound climatic and physical condition of the country, safeguarding of soil fertility and water supplies, and prevention of damage by erosion and flooding to rivers and agricultural land. Regionally, the setting aside in Indonesia of 800,000 hectares of pristine rain forest of Betung Kerihun in West Kalimantan as a national park reflects a similar need for environmental and biological resource conservation.

As a Totally Protected Area, Lanjak Entimau can contribute to the development of the forest industry and the State's economy with its share of extremely rich genetic resources for both timber and non-timber products. There are also potentials for the agricultural and fisheries sectors to selectively exploit the Sanctuary's resources for the development of the industries. These rural-based industries are more directly linked to the socio-economy of the local communities.

### **3. Project Design and Organization**

The Project was designed to enhance our knowledge on the biological resources of the Sanctuary specifically relating to species richness, diversity and distribution. This made it necessary to continue studies on flora and fauna groups that were not carried out during Phase I. New studies included inventories on the vascular plants, lichens and fungi, insect, small mammals and fish. At the same time two genebanks were established to support the State's long-term tree planting programme.

Economic activities were introduced in order to reduce the dependence of the local people on the Sanctuary's natural resources. Thus pilot projects on the cultivation of indigenous crops and rearing of indigenous fish were implemented. The local communities were consulted on the choice of plant and fish species for pilot projects. A study on the game animals was carried out to gauge the impact of hunting on the Sanctuary's game resource.

Emphasis was given on training of counterparts, senior officers and technical assistants from the Forest Department, and local community leaders and other individuals who participated in the Project. This training was regarded as an important prerequisite for the effective management of the Sanctuary through the collaborative effort of government agencies and the local communities.

The project was designed in accordance with ITTO Objectives and Criteria and the relationship to its Action Plan and Priorities. For the Forest Department, the project was designed to collect baseline data for the effective management of the Sanctuary and to assist the local communities in the sustainable use of selected plant and animal resources in the buffer zone. This would help to reduce their dependence on the Sanctuary.

#### **4. Project Implementation**

A difference in the costs of the project between planned and actual project implementation was noted. This difference was due to the devaluation of the Malaysian ringgit. Savings from the exchange rate were used in training, publications and extension of the project duration with the approval of ITTO.

The project components remained essentially unchanged except for the introduction of the subproject : the ITTO Borneo Biodiversity Expedition in 1997. Modifications in the schedules did not affect the implementation of the project. The desired outputs were achieved.

The economic downturn in 1997 which resulted in the devaluation of the Malaysian ringgit could not be predicted. The variation caused by this had in fact a positive impact on the Project's budget thus further enhancing the outputs.

Schedules for the implementation of the community-based activities were somewhat disrupted due initially to the reluctance of the local participants to get involved in communal projects. Other problems were caused by the weather, the Dayak Gawai (New Year) and rice planting season.

The conditions for project implementation were favourable throughout so that project sustainability by the Forest Department after the completion will not become a problem. The Department will continue to monitor the community-based activities and genebanks and will form a special Wildlife Committee to manage the Sanctuary with the full participation of the local communities.

Inputs by the ITTO and Malaysia Government were appropriate. The ITTO provided funds for engagement of consultants and local supporting staff, field equipment, travels and report preparation. The Forest Department (Executing Agency) provided funds for infrastructure, local counterparts and field staff and logistics. Only the required number of consultants and counterparts were engaged. With their good knowledge and experience, it was possible to complete the project successfully to achieve the desired outputs.

The ITTO had made it possible, through four years (Phase I & II) of intensive research, to establish LEWS as one of the richest biodiversity conservation areas in the humid tropics. It was also through ITTO's initiative effort that the Betung Kerihun-Lanjak Entimau Trans-boundary Conservation Area became a reality in 1994. The first ITTO Borneo Biodiversity Expedition to this Trans-boundary Conservation Area in 1997 represented a pioneer effort in joint biodiversity research and management between Indonesia and Malaysia. It paved the way for further co-operation in the conservation of Borneo's diverse and fast-disappearing biological resources.

## **5. Project Results**

More information has been added from Phase II. Phase I collected information on the forest types, ethnobotany, mammals, birds, reptiles and amphibians and socio-economy of the local communities. Phase II has included studies on inventories of vascular plants and fungi, insects, small mammals, and fish. Further information was collected on ethnobotany and reptiles and amphibians. Two genebanks for seed production were established.

Another achievement was the implementation of the community-based development activities on cultivation of indigenous crops and rearing of indigenous fish species which the local people participated.

The findings from the project were supplemented by additional studies conducted under the sub-project entitled ITTO Borneo Biodiversity Expedition (IBBE) 1997. The expedition collected a lot of valuable data on sociology, forest types, botany, medicinal plants, primates, fish, birds, reptiles and amphibians. The expedition provided the opportunity for comparative studies on the ecology, species richness and populations of the flora and fauna of Central Borneo. The results were contained in the expedition's scientific report published in 1999.

The Sanctuary is now known to contain 2,807 species of vascular plants, 218 species of medicinal plants, 158 species of jungle fruits, 108 species of jungle vegetables, 500 species of fungi, 42 species of lichens, 6 species of primates, 48 species of small mammals, 235 species of birds, 73 species of reptiles and amphibians, 82 species of fish and 1,053 species of insects.

Studies under the community development activities indicated that indigenous crop planting and fish rearing are feasible and profitable, and would no doubt contribute to raising the socio-economic status of individuals, families or communities who are willing to take up the new ventures.

Findings from Phase I and Phase II are contained in the scientific report soon to be published.

The Sanctuary's resources will be further put into good use for the benefit of the local residents when many valuable plant and fish species will be selected for cultivation and breeding under the community-oriented agro-forestry projects in Phase III.

The Project results had no direct impact on sectoral programmes. However, encouraged by the practicality of the community development programme, the Forest Department, through its National Parks and Wildlife Division, would be introducing the concept to the local communities residing around the Batang Ai National Park. Co-management of the Park involving direct community participation was also envisaged.

The declining fish population in some areas of the buffer zone had made it necessary to protect important breeding areas from further deterioration. The local people have gradually perceived the conservation initiative of the Government as beneficial to their economic and social well-being.

There will be little problem on the project sustainability because the Project as it was conceptualised, was appropriate for the Forest Department to adopt. This is in line with its strategy to manage the Sanctuary through local participation. In order to ensure effective management the Department is providing more infrastructure and recruiting more staff for the Sanctuary.

- **Infrastructure**

The headquarters complex was planned to be built in two stages. Stage one consisted of three blocks for an office and staff and visitor accommodation, and would be completed in 2000. Stage two will include more accommodation for rangers and scientists, a simple working laboratory and a centre for information and display.

The field station laboratory has been completed, while the sub-ranger stations and sub-camps will be completed during 2000.

Two climatological and hydrometric stations were set up, one in Ng Bloh, Ulu Katibas, the other in Ulu Mujok.

Two genebanks with a total area of 10.71 ha containing 1,245 potential timber trees were established.

- **Management guidelines and areas for community-based development projects**

The management guidelines on priorities for biodiversity inventories and ecological studies are given in the Final Report.

Three areas in the buffer zone had been identified for community-based resource development projects during Phase II. The Ulu Katibas components included one concrete tank and one valley pond for fish rearing, and plots for planting of indigenous crops. Seven households participated in the pilot studies. There was also plan to establish a 20-hectare indigenous plant garden at the Sanctuary's headquarters. Planting is proposed under Phase III.

At the Ulu Mujok site one valley pond was constructed and four families participated in indigenous crop planting. A similar plot had been established at the compound of the Ranger Station. The project also assisted the primary school there to develop a fruit garden.

The project has identified a third site in the Batang Ai area for the development of a field centre for training, demonstration and eco-tourism. This centre is proposed to be developed under Phase III.

- **Traning**

On-the-job training for the counterparts and research assistants was emphasised as these officers already have at least five years of working experience with the Department. Besides already having background knowledge in their respective fields, many have undergone training courses organised by the Department.

On-the-job training helped to sharpen their skills in field observation and refine their techniques in inventories and species identification. Species identification both in the field and in the herbarium or laboratory was emphasized.

The project provided the opportunity for training in areas of studies that were less familiar to many of the participating officers as many of them had not been involved in such studies prior to this. The new studies included fish, reptiles and amphibians, small mammals and establishment of genebanks.

In order to ensure project sustainability after the project completion, there is a need for the Forest Department to strengthen its biodiversity research and management skills by recruiting and training more qualified staff through the corporatisation process. This would also prepare the Department for the co-management of the Trans-boundary Conservation Area with Indonesia.

Trainees from the local communities were broadly classified into two groups. The first group comprised older participants who had little or no education. The second group of participants were younger and had basic education. Many were recruited as assistants to work in the ranger stations.

Both groups were trained on the concept of biodiversity, conservation and the establishment and management of community development projects. To familiarise themselves with the concept and long-term benefits of conservation and sustainable utilization of resources, they were taken on a tour of the Batang Ai National Park on eco-tourism and government and private on-farm projects in crop planting and fish rearing near Kuching.

## **6. Synthesis of the Analysis**

- (a) Specific objectives were realised
- (b) Outputs were realised through a programme of intensive field work. Additional data and information were also collected during the ITTO Borneo Biodiversity Expedition in 1997.
- (c) Schedule was delayed but not seriously. Reasons for the delay have been explained.
- (d) Actual expenditures were generally more than 10% above planned under the items on "local support staff" and "air travel".
- (e) In view of the small proportion of areas studied, there is potential to extend the studies to other areas, either with ITTO support or by the Forest Department.
- (f) There is significant potential for scaling-up as more inputs are required because of the extremely rich biological resources. The Forest Department should ensure that ecological studies and resource inventories are continued as a part of its future management programme for the Sanctuary.

## **PART III : CONCLUSIONS AND RECOMMENDATIONS**

### **(a) Development Lessons**

Biodiversity research and inventories were designed to build up baseline data for the Sanctuary's management. The community-oriented programme provided training and support to the local communities in raising their living standard. From the project implementation and results, it is recommended that:-

- (i) adequate protection of the Sanctuary from illegal encroachment is ensured as a priority of the Forest Department. Cutting of the boundary is a positive step in this direction. Additional ranger stations should be built at strategic entry points and more wildlife rangers must be recruited to carry out strict enforcement of rules;
- (ii) over fishing and illegal hunting are critical in some areas of the buffer zone and needs to be more strictly controlled;
- (iii) in addition to the existing zoning, more special protection zones should be identified for the protection of flora and fauna in areas sensitive to human disturbance;
- (iv) the research carried out so far has concentrated on systematic baseline data inventory. Studies relating to the biology, population dynamics and growth rates of selected valuable commercial plant, fish and animal species are necessary as a part of resource management and sustainable utilization;
- (v) fuller utilization of selected resources can be made to promote development in the forestry and socio-economic aspects;
- (vi) apart from continuing further resource inventories and research, monitoring of economically important resources such as genebanks, fisheries and game animals must be undertaken by the Forest Department;
- (vii) educational programmes on conservation and sustainable resource utilisation should be continued among the local communities to clear their misconceptions and fear regarding the purpose of TPAs;
- (viii) to be effective as a custodian, the Forest Department must strengthen its manpower in all fields bearing in mind that the Sanctuary's management is necessarily multi-disciplinary in nature;

- (ix) further assistance and support are to be extended to the local communities through the setting up of a permanent field centre to provide training on co-management and sustainable utilization of the Sanctuary's resource;
- (x) the Batang Ai National Park, with an area of 24,000 hectares, shares a common boundary with LEWS and BKNP. It should be included into the Trans-boundary Conservation Area to provide a continuous habitat for the orangutan and numerous other valuable plant and animal species;
- (xi) co-management with Betung Kerihun N.P. in West Kalimantan is important particularly to ensure the survival of threatened species such as orangutan, and to maintain the Trans-boundary Conservation Area as one of the few pristine areas in Borneo for plant and animal species to serve mankind's future needs.

### **(b) Operation Lessons**

Proper project planning and organization were found to be critical to ensure smooth implementation as most of the activities were short-term lasting only six months. Close co-ordination with participating officers of the Forest Department was maintained throughout the project phase.

Although the Forest Department as the Executing Agency had been very supportive, further improvement could be made with the availability of more full-time counterparts and technical assistants to more fully gain from on-the-job training and to ensure the project's sustainability.

One way to overcome the problem is to recruit interested fresh graduates to be attached to the project to undertake studies leading to post-graduate degrees. These officers would then be able to continue the work of the consultants in further research and resource monitoring.

### **(c) Recommendations for Future Projects**

#### **(i) Project Identification and Design**

Phase II results have pointed to the need for specific aspects of biodiversity inventory to be continued particularly with the proposed inclusion of the Batang Ai National Park into the Trans-boundary Conservation Area. Sharing the benefits of the Sanctuary's resources with the local communities has also been identified as a necessary management strategy. It is also imperative to exploit the



full potential of the one million hectare Trans-boundary Conservation Area by pursuing a collaborative research and management programme with Betung Kerihun N.P.

Future projects can be developed to produce outputs in population dynamics and plant and animal relations, as well as community-oriented activities to meet the basic subsistence needs of the local people. Biodiversity research will emphasize studies on the commercial aspects of selected species such as seed production and ornamental plants. Community-oriented development will concentrate on the development of indigenous crops, fish and game species and handicrafts to raise the living standards of the local communities.

### **(ii) Project Implementation**

The Forest Department would play a key role in implementation as the Executing Agency of the project. In addition to the counterparts, new graduates would be recruited to undergo systematic training with the consultants.

### **(iii) Project Organization and Management**

The Project Leader would be responsible for the Project's organization and management. This is done through close liaison with the Director of Forests, the Projects Coordinator, the local counterparts and the ITTO consultants. The Project Coordinator would monitor the Project's implementation and progress on a regular basis. Close collaboration with the relevant agencies must be maintained at all times. Future management strategies should take into consideration the need to work with Betung Kerihun National Park through the Task Force for the Trans-boundary Conservation Area.

### **Responsible for the Report:**

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