

5. PROGRAMME DESIGN

The following text describes the Programme in terms of its objectives, outputs, activities, inputs, important assumptions, implementation structure and prior obligations. Most of this information is summarised in standard format of the Programme Design Matrix (PgDM) in **Annex 1**, Project Design Matrices (PDMs) in **Annex 2** and Plan of Operation (PO) in **Annex 3**.

5.1 Overall Goal

The overall goal of the Programme is defined as:

“The endangered and precious biodiversity and ecosystems of Sabah are conserved.”

The accomplishment of this overall goal can be measured over a much longer period of time than the five (5) years project duration. The overall goal should in principle be measurable by the increase of the total protected areas in Sabah. Definition of “protected area” in this case refers to IUCN classification, and the data on the total protected area are, and will be, collected and compiled mainly from the IUCN Protected Area List. Though it is preferable to set a target numeric value of the total protected areas here, there is not enough information to define the target numeric value yet. ’

5.2 Programme Purpose

The programme purpose is defined as:

“Comprehensive and sustainable conservation approaches of biodiversity and ecosystem are established.”

This purpose is expected to be achieved by the end of the Programme duration (five years from January, 2002 until January, 2007), and its accomplishment should be measured by compilation of an accomplishment report of the programme.

5.3 Project Purposes

As described in Section 4.2, the Programme consists of four components with the same scale and scope as those of a normal project of JICA scheme. The above programme purpose is expected to be accomplished by achieving project purposes of all the four components and two more purposes mentioned below.

5.3.1 Project Purpose of the Research and Education Component

The project purpose of the Research and Education Component is defined as:

“Research and education capacity for conservation of biodiversity and ecosystems of Bornean forest in Sabah is enhanced.”

The accomplishment of the above project purpose for the Research and Education Component can be measured by several indicators. Firstly, number of publications per year by researchers shall be more than ten (10) by the end of the Programme. To verify the number, Journals, books and proceedings of workshops and seminars, etc. written based on the results of the Component will be counted. Secondly, researches on two (2) key species in Crocker Range Park and Tabin Wildlife Reserve respectively shall be completed, and the research results shall be utilised for the management of these protected areas. The data on these indicators can be collected from annual reports of the implementing organisations and the management plans of the target areas.

5.3.2 Project Purpose of the Park Management Component

The project purpose of the Park Management Component is defined as:

“Effective management options for protected areas are developed.”

The accomplishment of the above project purpose for the Park Management Component can be measured by number of protected area management options in essential fields, i.e. communication, public relation, fire prevention etc. The “handbook” prepared by the Component can be used for verifying the number of options. Targeted number and quality of these options can not be defined at this moment yet, because of lack of information.

5.3.3 Project Purpose of the Habitat Management Component

The project purpose of the Habitat Management Component is defined as:

“An approach to habitat management for important species is established.”

The accomplishment of the above project purpose for the Habitat Management Component can be indicated by employment of the model established by the component for the other areas in Sabah.

5.3.4 Project Purpose of the Public Awareness Component

The project purpose of the Public Awareness Component is defined as:

“People of Sabah have better understanding and appreciation to the conservation of biodiversity and ecosystem.”

The accomplishment of the above project purpose for the Public Awareness Component can be

measured by increase of percentage of Sabah population understanding conservation, and increase of membership in environmental organisations. The data on the percentage of Sabah population understanding conservation will be collected from the baseline survey and post-evaluation results planned as activities of the component (Activities 2-4, 2-12). Then the data on membership in environmental organisations will be collected from these environmental organisations before and after the campaign. Targeted percentage and membership can not be defined at this moment yet.

5.3.5 Other Purposes Necessary to Achieve the Programme Purpose

Besides the four (4) project purposes above are fulfilled, three more purposes should be achieved for the accomplishment of the programme purpose, i.e.:

"A monitoring system among the agencies for comprehensive conservation is enhanced."

"Capacities of the relevant agencies are integrated for comprehensive conservation."

"The plan, progress and results of the Programme are made known to the public."

The accomplishment of *"A monitoring system among the agencies for comprehensive conservation is enhanced."* can be measured by two indicators. Firstly, the meetings of the Programme Steering Committee (once every six months) and each Working Group (once every three months) are held. Secondly the Programme Steering Committee starts operating the monitoring system by 2002.

The accomplishment of *"Capacities of the relevant agencies are integrated for comprehensive conservation."* can be measured by number of staffs of the other components trained at ITBC, and by changes of awareness of the communities in and around Crocker Range Park and Tabin Wildlife Reserve.

The accomplishment of *"The plan, progress and results of the Programme are made known to the public."* can be measured by number of publicity by printed and electronic media.

5.4 Outputs and Activities

In order to achieve the project purpose of each component, the following outputs are required to be produced. Activities to be implemented for achieving each output are also described.

5.4.1 Outputs and Activities for the Research and Education Component

1) Output 1: Linkages of implementing and related organisations are enhanced and developed.

Activities to be implemented:

- 1-1 Discuss on the detailed research plan for taxonomy and conservation biology among implementing organisations.
- 1-2 Establish protocol for collection and distribution of specimens.

- 1-3 JICA provides advice/ consultancy on designing research methods.
- 1-4 Create and upgrade communication system to provide two ways communication among implementing organisations by means of Webpages and others.
- 1-5 Exchange research results among implementing institutions.
- 1-6 Create opportunities for periodic forum/ academic associations.
- 1-7 Hold research seminars and workshops quarterly.
- 1-8 Publish research journals annually.

This output 1 is, in other words, institution building among implementing organisations essential for conducting the actual research (output 4), then it must be achieved before starting some activities under the output 4.

- 2) Output 2: Research and training facilities at UMS and other implementing organisations are developed.

Activities to be implemented:

- 2-1 Acquire relevant literature/ publication on taxonomy and conservation biology.
- 2-2 Make literature on taxonomy and conservation biology available.
- 2-3 Establish/ introduce database/ GIS system in ITBC-UMS.
- 2-4 Maintain the research facilities and equipment.

This output 2 is also a prerequisite for the actual research (output 4), and also the training (output 3). The activities above can be implemented simultaneously with some activities under the output 2, but achievement of output 2 should be before starting some activities for the output 3 and 4.

- 3) Output 3: Trained researcher for taxonomy and conservation biology are increased.

Activities to be implemented:

- 3-1 Provide training opportunities for research personnel.
- 3-2 Plan and run short term and medium term courses in Japan and UMS/ other institutions, including biodiversity assessment, research methodology, curatorial and data/ IT management.
- 3-3 Make and produce effective “kits” for effective teachings at various level (game warden, rangers).
- 3-4 ITBC gets many active students.
- 3-5 Japanese side and Malaysian side make efforts to obtain scholarship for postgraduate students and staff.
- 3-6 Run taxonomic and conservation biology courses (MSc, Ph.D., BSc/ BAs).
- 3-7 Train technical staff for equipment maintenance and operation.
- 3-8 Train personnel on dbase/ GIS system techniques.
- 3-9 JICA advises how to implement green auditing.

3-10 JICA provide volunteers/ experts to supervise, i.e. fieldwork/ research.

The output and the activities above are planned based on the assumptions that the number of staffs and students of ITBC-UMS will increase. This assumption is supported by the fact that the number has been increasing smoothly for recent years (see Table 5.4-1 and 5.4-2).

As the training for taxonomy and conservation biology at ITBC, UMS needs sufficient research and training facilities, therefore some of the activities above can be implemented only after the achievement of output 2.

Table 5.4-1 Number of staff of ITBC

Year	1997	1998	1999	2000	2001	2002(estimate)
Number of staffs	11	6	6	19	23	29

Source: Information from ITBC

Table 5.4-1 Number of graduate students of ITBC

Year	1997	1998	1999	2000	2001
Number of Ph.D. and M.Sc. graduated	0	0	2	3	4
Number of graduate students	10	18	26	25	23

Source: Information from ITBC

4) Output 4: Biodiversity and ecosystems in the target areas are studied and better understood.

Activities to be implemented:

- 4-1 Plan faunal and floral survey.
- 4-2 Programme Steering Committee sets up clear and simplified research application (mechanism) to do research on the target areas.
- 4-3 Establish permanent research plots.
- 4-4 Collect specimens from the target areas.
- 4-5 Prepare and classify the specimens.
- 4-6 Identify the specimens and set up reference collections.
- 4-7 Conduct ecological and taxonomic studies on organisms in the target areas especially on rare/ endangered species and prioritised organisms.
- 4-8 Prepare species list of the target areas.
- 4-9 Initiate long term monitoring of species composition in relation to climate change etc.
- 4-10 Conduct periodical monitoring on rare/ endangered species and prioritised organisms.

“The target areas” stated in this output 4 are Crocker Range Park, Tabin Wildlife Reserve, Kulamba Wildlife Reserve, Lower Kinabatangan and Maliau Basin (see **Figure 5.4-1**). As most of the activities above need expertise and research facilities, they can only be implemented after achievement of output 1, 2 and 3.

- 5) Output 5: Inventories and research findings are consolidated and compiled at the UMS and the relevant agencies, and to be made accessible to interested researchers, stakeholders and the public.

Activities to be implemented:

- 5-1 Standardise specimen management.
- 5-2 Establish systematic system of data management.
- 5-3 Establish multimedia databank (video, sound, photo) of nature in the target areas.
- 5-4 Establish and open database of taxonomic and conservation biology information on the internet.
- 5-5 Organise conferences.
- 5-6 Make exhibition for conservation of biodiversity in ITBC.
- 5-7 Present research findings at the international symposium, conference etc.
- 5-8 Publish books on research findings and papers.

Most of activities above can be implemented only after some research results are obtained through the activities under output 4.

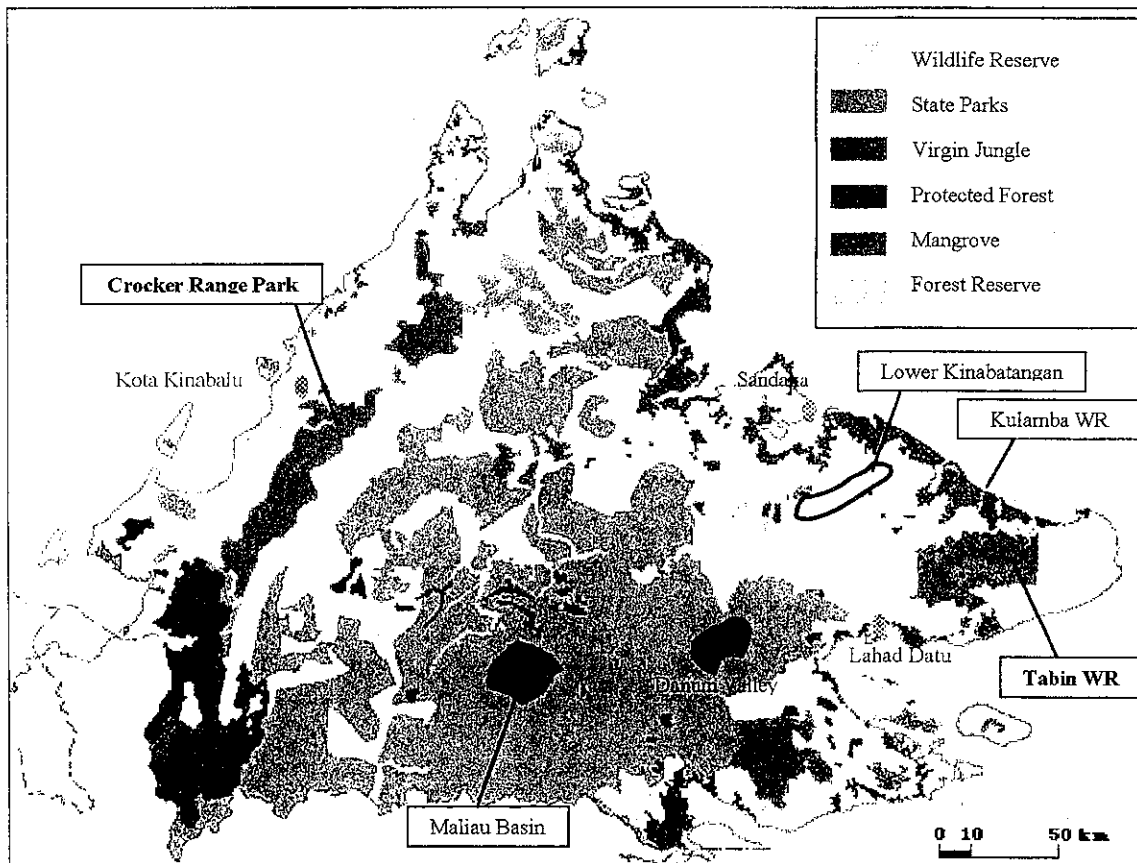


Figure 5.4-1 Target areas and pilot protected areas of the Programme

5.4.2 Outputs and Activities for the Park Management Component

- 1) Output 1: Relationship between local communities in and around the Crocker Range Park and the park management is studied and understood.

Activities to be implemented:

- 1-1 Identify communities having notable impact on the park management.
- 1-2 Study situation of the communities.
- 1-3 Conduct workshop/ dialogue/ discussion with communities to identify the people's need.
- 1-4 Analyse socio-economic aspects of local communities.
- 1-5 Study on alternatives to improve the relationship between the communities and the park management.

Crocker Range Park is a pilot protected area for this Component (see **Figure 5.4-1**). The output 1 to understand relationship between the local community and protection, this output can also be treated as a part of the output 4 (management of the pilot protected areas). However, as the relationship with local communities is a serious issue for Crocker Range Park, this output should be considered as the first output under this Component.

- 2) Output 2: Management plan is prepared for Crocker Range Park, taking into account of the relationship between the local communities and the park management.

Activities to be implemented:

- 2-1 Compile existing and collect additional data and information necessary for preparation of the management plan of Crocker Range Park.
- 2-2 Identify activities to be participated by the communities in and around Crocker Range Park.
- 2-3 Document traditional knowledge, complying with the procedure under the Sabah Biodiversity Enactment 2000.
- 2-4 Refer the results of the Research and Education Component (i.e. inventory of flora and fauna).
- 2-5 Establish/introduce GIS/ database system for Crocker Range Park.
- 2-6 Map focused/threatened habitat.
- 2-7 Plan on facilities and trails.
- 2-8 Plan ecotourism with studying carrying capacity.
- 2-9 Establish zoning scheme.
- 2-10 Identify problems and constraints of the conservation.
- 2-11 Identify potential buffer zone areas around Crocker Range Park.
- 2-12 Establish information linkage with Forestry Department Sabah for fire prevention.
- 2-13 Develop a unified strategy among the related governmental agencies to address the needs of the local communities in and around the park.
- 2-14 Develop the criteria for estimating the effectiveness of the management plan.

As described in Section 3.2.3 above, a management plan for Crocker Range Park has not been prepared yet. It should be noticed that Crocker Range Park shares more than a half of the total areas of the State Park in Sabah (see **Table 5.4-3**), then the preparation of the management plan for the Park and implementation is considered as effective for the management of the State Parks.

Table 5.4-3. Area of Crocker Range Park

Total area of the State Parks in Sabah (ha)	Area of the Crocker Range Park (ha)	Share of the Crocker Range Park in the total area of the State Parks
243,172	139,919	57%

Source: MOSTE (1998) and Sabah Parks (<http://www.jaring.my/sbhpark/>)

Before starting the management of the Crocker Range Park under output 4, this output 2 must be completed. The activity 2-4 can be implemented only after some useful research results are obtained under the Research and Education Component.

- 3) Output 3: Capacities of the implementing organisations in managing Crocker Range Park are increased.

Activities to be implemented:

- 3-1 Identify training needs concerning ongoing assistance on capacity building project.
- 3-2 Prepare training curriculum.
- 3-3 Train field staff of Crocker Range Park.
- 3-4 Organise training and seminars for staff of the HQs of the implementing organisations.
- 3-5 Provide degree/ post-graduate study opportunities for staff of implementing organisations at UMS and other universities.
- 3-6 Conduct staff exchange programme in related protected areas in Japan.
- 3-7 Provide exposure/ study tours for the staff of Crocker Range Park to other sites.
- 3-8 Review training effect and reflect the result to training plan.
- 3-9 Establish coordination mechanisms among the implementing organisations.

This output 3, in other words, is capacity building of implementing organisations, and it must be achieved before starting some activities for effective management of Crocker Range Park under output 4.

- 4) Output 4: Crocker Range park is better managed.

Activities to be implemented:

- 4-1 Implement the management plan for Crocker Range Park, e.g.
 - a- Establish research stations in Crocker Range Park.
 - b- Conduct training for local communities to be tour guides in Crocker Range Park.
 - c- Appoint honorary wildlife warden and Sabah Parks rangers from among the local communities as informers.
 - d- Encourage and implement ecotourism.
 - e- Establish substations for control and monitoring.
 - f- Establish conservation plan for key species, e.g. Rafflesia, big animals etc.
 - g- Cooperate with other governmental authorities when considering any development/ land-use

around Crocker Range Park.

- h- Establish Information centre in Crocker Range Park.
- i- Implement rehabilitation programme.
- j- Communication system for control and monitoring of the protected areas is enhanced.
- k- Establish and conduct long term climate monitoring research/ activities.
- l- Attractive facilities for eco-tourism (like canopy walk, canopy gondola) are built, which are able to use for monitoring.
- m- Conduct long-term ecological/ social monitoring.
- n- Prevent forest fires in/around Crocker Range Park.

The activity 4-1, implementation of the management plans, can be implemented after the completion of the management plan under the output 2.

- 5) Output 5: Experience/ lessons learned through the implementation of the management plans of Crocker Range Park are analysed and compiled.

Activities to be implemented:

- 5-1 Conduct interim review of the implementation of the management plan.
- 5-2 Hold seminar/ conference/ discussion to evaluate progress and success.
- 5-3 Produce records of implementation of the management plan.
- 5-4 Compile protected area management options as a handbook.

All activities above can only be implemented after some useful experience and lessons learned are acquired through activity 4-1 (implementation of the management plans).

5.4.3 Outputs and Activities for the Habitat Management Component

- 1) Output 1: Key species are selected.

Activities to be implemented:

- 1-1 Review existing data of the whole species, especially the protected species in Sabah.
- 1-2 Decide criteria for selecting key species.
- 1-3 Select species matching the criteria.

This output 1 is to select key species to be targeted by management plan(s) prepared by the Component. All the above activities must be implemented before the following outputs.

- 2) Output 2: Methods for monitoring the key species are developed.

Activities to be implemented:

- 2-1 Refer to relevant information collected by the Research and Education Component.
- 2-2 Refer to existing topographic and land-uses maps in and around Tabin Wildlife Reserve.

- 2-3 Draft methods for monitoring the key species.
- 2-4 Conduct preliminary field monitoring on the key species.
- 2-5 Decide the monitoring methods.
- 2-6 Prepare manuals of the monitoring methods.

3) Output 3: Monitoring personnel are trained for using the methods.

Activities to be implemented:

- 3-1 Identify officers, rangers, tourist guides, wildlife warden etc. involved in the monitoring.
- 3-2 Identify what kind of training is necessary for them to conduct monitoring, in relation to the ongoing capacity building project.
- 3-3 Formulate training module to suit the requirement.
- 3-4 Conduct the training of the methods for monitoring the selected key species.

4) Output 4: A habitat range of the selected key species is identified in and around Tabin Wildlife Reserve.

Activities to be implemented:

- 4-1 Set up an institution for implementation of the monitoring
- 4-2 Monitor the key species.
- 4-3 Plot monitoring results of the keys species on a map.

5) Output 5: Management plan(s) for the selected key species is(are) completed.

Activities to be implemented:

- 5-1 Refer to relevant information collected by the Research and Education Component.
- 5-2 Prepare a vegetation map in and around Tabin Wildlife Reserve, based on data from Forestry Department, UMS, Lands and Surveys Department etc.
- 5-3 Verify the vegetation map by field survey.
- 5-4 Comprehensive analysis of habitat requirement of key species based on the monitoring results and other maps.
- 5-5 Survey human activities and requirement around Tabin Wildlife Reserve.
- 5-6 Identify threats to the key species.
- 5-7 Draft the management plan(s) for the selected key species.

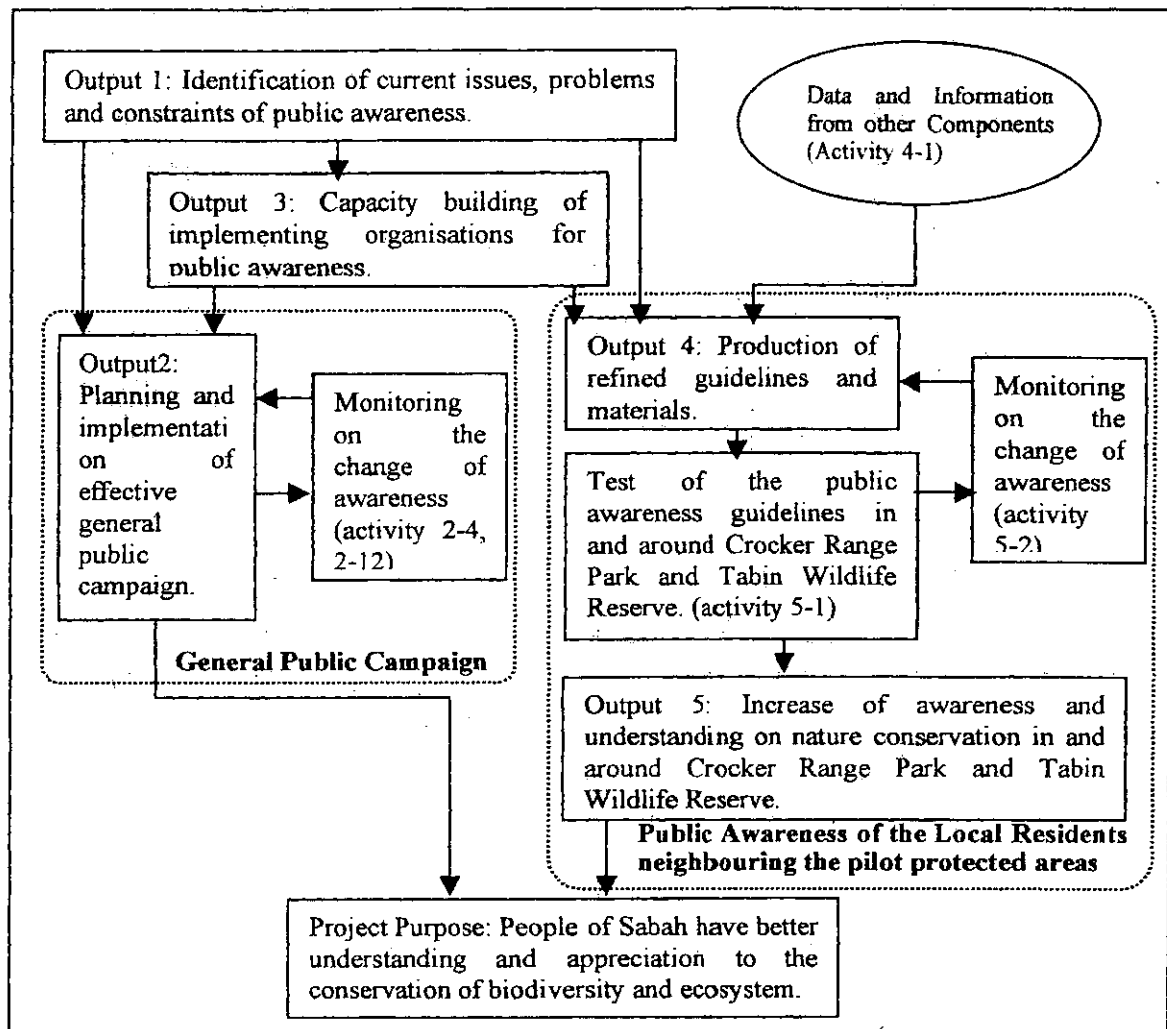
6) Output 6: New protected areas around Tabin Wildlife Reserve are proposed.

Activities to be implemented:

- 6-1 Identify needs to rehabilitate degraded areas around Tabin Wildlife Reserve, especially riverine habitat.
- 6-2 Identify and propose the conservation of important habitat surrounding Tabin Wildlife Reserve.

5.4.4 Outputs and Activities for the Public Awareness Component

The flow of the outputs and some activities under the Public Awareness Component is shown in Figure 5.4-1. The Component consists of two relatively independent flows of outputs and activities. One is the general public campaign mainly consisting of output 2, and the other is the public awareness for local



resident neighbouring Crocker Range Park and Tabin Wildlife Reserve.

Figure 5.4-1 Flow of the outputs and activities under the Public Awareness Component

1) Output 1: Current issues, problems and constraints of public awareness are identified.

Activities to be implemented:

- 1-1 Establish a coordination office to coordinate all Activities.
- 1-2 Pre-test of the study (sampling number, area and field survey method)
- 1-3 Conduct field survey on problems and constraints in the pre-studied areas.
- 1-4 Study current public awareness activities in the pre-studied areas.

2) Output 2: Effective general public campaign are planned and implemented.

Activities to be implemented:

- 2-1 Identify target people (e.g. school children) of the general public campaign.
- 2-2 Identify necessary themes for the campaign.
- 2-3 Formulate a strategic plan of campaign (selection of media, media, method and schedule).
- 2-4 Conduct surveys to obtain baseline data
- 2-5 Involve the policy makers/ decision makers in the campaign.
- 2-6 Involve the media (radio, TV, newspaper) in the campaign.
- 2-7 Produce campaign materials.
- 2-8 Organise conferences and speeches, and conduct dialogues/ discussion.
- 2-9 Interact with international children's eco-tour to Sabah.
- 2-10 Conduct competitions of photography, essays and creative arts.
- 2-11 Create and upgrade the webpage.
- 2-12 Monitor effect of campaign on people.

3) Output 3: Capacity of the implementing organisations is enhanced.

Activities to be implemented:

- 3-1 Identify training needs on implementing organisations' staff.
- 3-2 Train the staff of implementing organisations.
- 3-3 Establish communication system (webpage newsletter, etc.).
- 3-4 Conduct staff exchange programme among the implementing organisations.
- 3-5 Study tour for staff of implementing organisations.

4) Output 4: Refined guidelines and materials are produced.

Activities to be implemented:

- 4-1 Analyse the results of the socio-economic study under Component 1 (Research and Education Component), 2 (Park Management Component) and 3 (Habitat Management Component).
- 4-2 Identify best medium and method for effective public awareness activities.
 - Search for best practices in other parts of the world on materials for public awareness.
 - Involve social organisation to advice on effective communication methods.
- 4-3 Conduct meeting/ workshop to evaluate/ standardise public awareness guidelines.
- 4-4 Produce and distribute a guideline for the public awareness.
- 4-5 Produce and distribute materials for the public awareness and environmental education.
- 4-6 Revise guidelines and materials after their testing in Crocker Range Park and Tabin Wildlife Reserve.
- 4-7 Compile public awareness materials to be used in other areas/ status in Malaysia.

5) Output 5: Awareness and understanding on nature conservation is increased in and around Crocker Range Park and Tabin Wildlife Reserve.

Activities to be implemented:

5-1 Test the public awareness guideline in Crocker Range Park and Tabin Wildlife Reserve.

(Possible Activities under the guideline)

- a. Identify and adopt schools and villages for nature education and awareness.
- b. Establish a “mobile unit” that visits villages and schools around Crocker Range Park and Tabin Wildlife Reserve.
- c. Involve NGOs and volunteers for environmental education.
- d. Involve and get support of the private sector.
- e. Conduct environmental awareness camp.
- f. Conduct seminars/ talk on environmental issues.
- g. Study tour for target local groups.
- h. Conduct various competitions among school children related to conservation and ecosystem in Crocker Range Park and Tabin Wildlife Reserve.
- i. Organise seminars for journalists.

5-2 Monitor change of awareness of the people.

5.4.5 Other Activities Necessary for Achieving the Programme Purpose

Beside the four (4) project purposes, the following purposes to be achieved for accomplishment of the Programme Purpose, as described in Section 5.3.5.

“A monitoring system among the agencies for comprehensive conservation is enhanced.”

“Capacities of the relevant agencies are integrated for comprehensive conservation.”

“The plan, progress and results of the Programme are made known to the public.”

To achieve the above purposes the following activities should be implemented.

- 1) Activities for achieving “A monitoring system among the agencies for comprehensive conservation is enhanced.”
 - 1 Hold a meeting of each Working Group once in every 3 months.
 - 2 Hold a meeting of Programme Steering Committee once in every 6 months.
 - 3 Design a monitoring plan of the Programme.
 - 4 Enable each Working Group to monitor implementation of Activities and achievement of Outputs and Project Purpose.
 - 5 Enable the Programme Steering Committee to monitor the achievement of the Outputs, Project Purposes and Programme Purpose.
- 2) Activities for achieving “Capacities of the relevant agencies are integrated for comprehensive conservation.”

- 1 Utilise the educational capacity of ITBC improved through the Research and Education Component, to train staff of the other Components.
 - 2 Utilise the research results of the Research and Education Component to prepare the management plans under the Park Management Component.
 - 3 Utilise the research results of the Research and Education Component for the management plan(s) for the selected key species under the Habitat Management Component.
 - 4 Utilise the research results of the Research and Education Component for the Public Awareness Component.
 - 5 Utilise the information about local communities collected by the Park Management Component and the Habitat Management Component to refine guidelines and materials of the Public Awareness Component.
 - 6 Make the staff of Implementing Organisations of the Park Management Component and the Habitat Management Component understand environmental education, by the results of the Public Awareness Component.
 - 7 Hold workshops to share the results of each component by all the participating organisations of the Programme.
- 3) Activities for achieving “The plan, progress and results of the Programme are made known to the public.”
- 1 Science and Technology Unit publicise plan, progress and results of the Programme through printed and electronic media.

5.5 Inputs

The following inputs from both Japanese side and Malaysian side are necessary to undertake the activities listed above. More details of inputs are described in **Annex 4** and **Annex 6**, as the Term of Reference (TOR) of long-term experts and specification of major equipment.

5.5.1 Inputs for Overall Management of the Programme

To implement the activities described in Section 5.4.5 (activities out of the four components), the following inputs are needed.

1) Inputs from the Japanese Side

Experts

- 1 long term expert (Chief Advisor)
- 1 long term expert (Programme Coordinator)
- Members of the Joint Evaluation Missions.

2) Inputs from the Malaysian Side

Staff allocation

- Programme Steering Committee
- Programme Director
- Deputy Programme Director
- Members of the Joint Evaluation Missions

Buildings, facilities and equipment

- Office space and administrative services by ITBC and Science and Technology Unit

5.5.2 Inputs for the Research and Education Component

1) Inputs from the Japanese Side

Experts

- 1 long term expert (Systematic Biology)
- 1 long term expert (Inventory / Museum Management)
- 1 long term expert (Conservation Biology)¹
- Short term experts (Entomology)
- Short term experts (Plant Taxonomy)
- Short term experts (Aquatic Taxonomy)
- Short term experts (Field Research)
- Short term experts (Forest Ecology)
- Short term experts (GIS)²
- Short term experts (Database System)³
- Short term expert (Green Auditing)
- Short term expert (Audio Visual) ⁴
- Volunteer (Specimen Management, when available)
- Volunteer (Database Management, when available)

Provision of equipment

- Facilities/equipment for taxonomy and conservation biology (including those to preserve the specimen collection) and education.
- Vehicles

Training

- Taxonomy
- Conservation Biology/ Field Research

¹ The long-term expert for Protected Area Management under the park management component can hold this post concurrently.

² The short-term experts dispatched for the other component can hold these posts concurrently.

³ The short-term experts dispatched for the other component can hold these posts concurrently.

⁴ The short-term experts dispatched for the other component can hold these posts concurrently.

- Curation
- Database Management

Others

- Partial cost for workshops and training courses.

2) Inputs from the Malaysian Side

Staff allocation

- Animal Taxonomy: 10p
- Plant Taxonomy: 10p
- Conservation Biology: 8p
- Technicians for preparing specimens (parataxonomist): 7p
- Librarian: 1p
- Research Officer: 1p
- Working group for the Component
- Administrative personnel

Buildings, facilities and equipment

- Facilities/equipment for taxonomy and conservation biology (including those to preserve the specimen collection)
- Building for the research
- Facilities for Japanese experts (rooms and telephone etc.)

Others

- Operation cost for the facilities/equipment.
- Cost for research and publication

5.5.3 Inputs for the Park Management Component

1) Inputs from the Japanese Side

Experts

- 1 long-term expert (Protected Area Management)
- 1 long-term expert (Community Participation)
- Short-term experts (GIS)
- Short-term experts (Management/ exhibition at the visitor centre)
- Short-term experts (Monitoring of threatened species)
- Volunteer (Plant Ecology, when available)
- Volunteer (Entomology, when available)
- Volunteer (Community Development, when available)
- Local consultants for preparation of the management plan of Crocker Range Park (“Local Small-scale Development Study”)

Provision of equipment

- Facilities of the information centre in Crocker Range Park.
- Facilities for research stations in Crocker Range Park.
- Vehicles
- Equipment for monitoring endangered species
- GIS (hardware/ software)

Training

- Protected Area Management
- Monitoring of threatened species
- Management and exhibition of the visitor centre
- GIS

2) Inputs from the Malaysian Side

Staff allocation

- Counterparts for JICA experts
- Staff for Crocker Range Park: 50p
- Assignment of a contact officer of each District Office
- Social scientist for the Output1
- GIS specialist (UMS/ Forestry Department)
- Trainers
- GIS data informers (UMS/ Forestry Department/ Lands and Surveys Department)
- Working group for the Component
- Administrative personnel

Buildings, facilities and equipment

- Facilities for Japanese experts (rooms and telephone etc.)
- Travel Allowance of Malaysian Staff
- Secretarial service

5.5.4 Inputs for the Habitat Management Component

1) Inputs from the Japanese Side

Experts

- 1 long term expert (Wildlife Management)
- Short-term experts (Protected area Planning)
- Short-term experts (GIS)
- Short-term experts (Wildlife Biology)
- Short-term experts (Monitoring of Animal Behaviour)
- Volunteer (Aquatic/ Semi-aquatic Animal Ecology, when available)
- Volunteer (Terrestrial/ forest Animal Ecology, when available)
- Volunteer (Plant Ecology, when available)

Provision of equipment

- GIS (hardware/ software)
- Radio/GPS tracking equipment
- Vehicles (4WD)
- Boats
- Field equipment

Training

(Depend on the result of Activity 3-3)

2) Inputs from the Malaysian Side

Staff allocation

- Permanent counterpart from the Wildlife Department.
- Counterparts from all other Implementing Organisations
- Staff for Tabin Wildlife Reserve: 20p
- Working group for the Component
- Administrative personnel
- GIS data informers (Forestry Department, Lands and Surveys Department, UMS)

Buildings, facilities and equipment

- Facilities for JICA experts (e.g. working rooms, direct telephones etc.)
- Operating cost

5.5.5 Inputs for the Public Awareness Component

1) Inputs from the Japanese Side

Experts

- 1 long-term expert (Environmental Education)
- Short-term experts (Information and Communication Technology)
- Short-term experts (Multimedia)
- Volunteer (Information and Communication Technology, when available)
- Volunteer (Environmental Education, when available)

Provision of equipment

- Vehicle (4WD)
- Information Communication Technology equipment
- Desk-top Publishing equipment
- Audio Visual Equipment
- Partial cost when contracting out some of the activities for local consultants and NGO is necessary

Training

- Environmental Education (for the general public campaign)
- Environmental Education (for the school children)

2) Inputs from the Malaysian Side

Staff allocation

- Coordinator at Science and Technology Unit
- Counterpart(s) from Science and Technology Unit for JICA expert and JOCV volunteer on Information and Communication Technology
- Counterparts on Public Awareness from all implementing organisations
- Campaigners from Public Awareness Sub-committee of EAC and other NGOs (i.e. PACOS, WWF, Malaysian Nature Society, Sabah Nature Club etc.)
- Rangers from Sabah Parks and Wildlife Department

Buildings, facilities and equipment

- Facilities for JICA experts (e.g. working rooms, direct telephones etc.)

Others

- Operating Cost
- Recurrent cost for the NGOs' activities.

5.6 Important Assumptions and Risk Analysis

The principal assumptions underlying the project are that: -

- The overall goal ("The endangered and precious biodiversity and ecosystems of Sabah are conserved.") is expected to be accomplished several years after the end of the Programme. As an assumption for the accomplishment of the overall goal, the implementing organisations need to follow the approaches established by the Programme even after the end of the Programme.
- When any researchers publish findings acquired from the Programme, the written permission of the Programme Steering Committee is necessary, to consolidate and compile all research findings at the UMS and the relevant agencies, and to make them accessible to interested researchers, stakeholders and the public.
- To prepare management plan(s) for the selected key species under the Habitat Management Component, existing digitised and non-digitised thematic maps and aerial photographs should be available for the Programme.
- The project purpose of the Public Awareness Component is "People of Sabah have better understanding and appreciation to the conservation of biodiversity and ecosystem." This can contribute to the higher purposes, i.e. the programme purpose and overall goal, only if the public shall actually change their behaviour to protect nature and to participate in conservation of biodiversity and ecosystems in Sabah, based on the their understanding and appreciation to conservation.

- In the case of the Public Awareness Component includes awareness activities for schools, the cooperation and approval from Department of Education are essential for the activities.
- To monitor change of public awareness in and around Crocker Range Park and Tabin Wildlife Reserve under the public awareness component, baseline data need to be obtained sufficiently.
- To monitor the achievement of the Outputs, Project Purposes and Programme Purpose, most members of the Programme Steering Committee and Working Groups continue working for the implementing organisations.
- To conduct activities under the Programme, new policy or enforcement of laws and regulations related to the conservation emerging after the commencement of the Programme will not contradict the Programme.

5.7 Implementation Structure

5.7.1 Implementing Organisations

The agencies and institutions listed under each component below jointly implement the activities to pursue the objective of respective components. The implementing organisations allocate and assign sufficient number of qualified staff, administrative personnel, budget and facilities necessary to pursue the objective of respective components.

The leading organisation of each component is responsible for the organising and functioning of the Working Group stated in Section 5.7.4 below.

1) Implementing organisations of the Research and Education Component

- ITBC, UMS (The leading organisation)
- Forestry Department
- Wildlife Department
- Sabah Parks
- Sabah Foundation

2) Implementing organisations of the Park Management Component

- Sabah Parks (The leading organisation)
- Wildlife Department
- Forestry Department
- District Offices of Crocker Range Park

- UMS
 - Lands and Surveys Department
 - Environmental Conservation Department
- 3) Implementing organisations of the Habitat Management Component
- Wildlife Department (The leading organisation)
 - Forestry Department
 - Sabah Parks
 - District Offices of Tabin Wildlife Reserve
 - UMS
 - Lands and Surveys Department
 - Environmental Conservation Department, and
 - Sabah Foundation
- 4) Implementing organisations of the Public Awareness Component
- Science and Technology Unit (The leading organisation),
 - Environmental Action Committee (Public Awareness and Education Sub-Committee)
 - UMS
 - Sabah Foundation
 - Forestry Department
 - Sabah Parks
 - Environmental Conservation Department
 - Wildlife Department, and
 - District Offices of Crocker Range Park and Tabin Wildlife Reserve

Other agencies and NGOs may be invited to join through the recommendation of the Working Groups and the approval of the Programme Steering Committee.

5.7.2 The Programme Steering Committee

1) Functions

The Programme Steering Committee: -

- Discusses and decides overall management and coordination of the Programme,
- Reviews, advises and endorses the plan of the four (4) components submitted by each Working Group,
- Reviews, advises and endorses the progress of the four (4) components submitted by each Working Group, and
- Discusses and decides on any other matters related to the Programme.

2) Composition

The Programme Steering Committee is composed of (see **Figure 5.8-1**): -

- Chairman: The State Secretary of Sabah
- Deputy Chairmen: The Vice Chancellor of UMS
JICA's Chief Advisor for the Program
- Members⁵: Director, Regional Economics and Environment, Economic Planning Unit, Prime minister Department
Permanent Secretary, Ministry of Tourism, Environment, Science and Technology
Secretary, Natural Resources Office
Director, State Economic Planning Unit
Director, Lands and Surveys Department
Director, Forestry Department
Heads of the four (4) Working Groups
The Program Coordinator and other delegates from JICA
Others appointed by the Chairman
- Secretary: Director, ITBC, UMS

4) Frequency of Meeting:

The Programme Steering Committee meets once in every six (6) months.

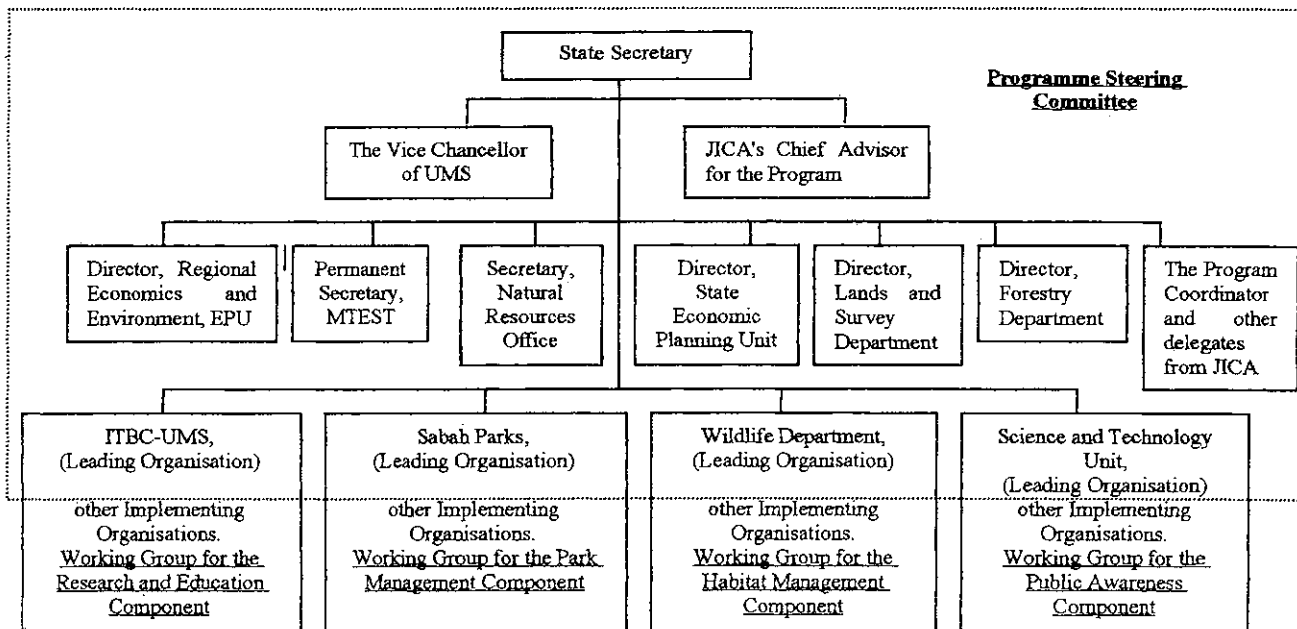


Figure 5.8-1 Structure of the Programme Steering Committee

⁵ Official(s) of the Embassy of Japan may attend the Programme Steering Committee Meeting as observer(s).

5.7.4 Working Groups

A Working Group for each component is formed. The Working Groups coordinate planning, implementation, monitoring and other necessary matters to bring the best result of each component with maximum effectiveness and efficiency.

The Working Groups prepare the project design and operation plan, progress and monitoring reports for the review and endorsement of the Programme Steering Committee.

Each Working Group is composed of the representatives of the implementing organisations and the Japanese personnel assigned to the respective component. The JICA Chief Advisor and the Program Coordinator are the members of all the Working Groups.

Component Managers, as the heads of Working Groups are the representatives of the leading organisations of each component. The JICA Chief Advisor acts as Co-Heads of all the Working Groups. The leading organisations acts as the secretariat of each Working Group.

The Working Groups meet at least once in every three (3) months.

5.7.4 Secretariat Offices of the Programme

ITBC, UMS and Science and Technology Unit act as the secretariat offices of the Programme. The secretariat offices coordinates matters pertaining to the Programme administration and logistics.

5.8 Prior Obligations and Prerequisites

As a precondition for commencement of the Programme, mobilisation of the Inputs listed Section 5.5 above should be assured, including assignment of appropriate experts from the Japanese side, and operating cost, e.g. allowance for Malaysian personnel assigned to the Programme activities etc., from the Malaysian side

6. PROJECT JUSTIFICATION

6.1 Impact

6.1.1 Expected impact of the project

1) Impact for development policy framework

Achievement of the overall goal is one of positive impacts of the Programme. As described in Section 5.1, the overall goal of the Programme is *“The endangered and precious biodiversity and ecosystems of Sabah are conserved.”* and its accomplishment is measured by the increase of the total protected areas in Sabah.

All categories of protected areas occupy 7.6% of the state land (see **Appendix 8** and **9**), and **Table 6.1-1** shows the past change of total area of the protected areas in Sabah. Since the late 1980s, the total area of the protected areas has not been increased much. By achieving the objectives of the Programme, the increase of the total protected areas in Sabah is expected several years after the end of the project.

Table 6.1-1 Change of total area of the protected areas in Sabah

Year	~1980	1985	1990	1995	2000
Total area of the protected areas in Sabah (ha)	108,782	462,052	462,052	505,852	544,852

Data source: MOSTE (1997)

2) Impact for institutional framework

The programme includes many outputs and activities related to training of the staffs of all the implementing organisations and coordination among the implementing organisations. At least 160 members of the implementing organisations in total are expected to be involved in the Programme as counterparts, officers in charge and implementers of the Programme.

As major impacts of such outputs and activities of the Programme, it is expected that each implementing organisation will enhance its institutional capacity. Furthermore, it is expected that the various implementing organisations will be functioning as a system for the conservation of biodiversity and ecosystems, by combining activities on the research, park management, habitat management and public awareness.

3) Impact on socio-economy of people

a) Description of the beneficiaries

According to the PDMs (see **Annex 2**), the target group of the Research and Education Component is the five (5) implementing organisations of the component, the target group of the Park Management Component is the implementing agencies of the component and local people living in and around Crocker Range Park, the target group of the Habitat Management Component is the implementing agencies of the component and local communities around Tabin Wildlife Reserve, and the target group

of the Public Awareness Component is people in Sabah. The target groups are also considered as beneficiaries of the Programme.

b) Number of the beneficiaries

It is expected that the Programme will benefit whole population of Sabah State eventually.

c) Contents of the benefit

Though the Programme is expected to benefit the whole population of Sabah state eventually, its positive impact reaches relatively limited people during the programme period, i.e. the implementing organisations and the local resident of the areas targeted by the Components. The benefit for the rest of the population in Sabah shall be realised gradually after the Programme, by the continuous application of the comprehensive and sustainable approach for conservation established by the Programme.

4) Impact from the technical standpoint

a) Number of counterparts

The numbers of counterparts and officers in charge of the Components are, thirty-five (35) for the Research and Education Component, fourteen (14) for the Park Management Component, nineteen (19) for the Habitat Management Component, and nine (9) for the Public Awareness Component at least.

b) Contents of the capacity building

Benefit of transfer of technology to the counterparts and officers in charge above is expected to be realised during the Programme and to be expanded even after the Programme

5) Economical benefit

It is generally believed that conservation of biodiversity and ecosystem would produce economic values, though such value is not always marketable. Expected economic values include benefits from the eco-tourism, the biotechnological resources, water holding and purification capacity of forests, etc. As described in Section 2.1.2, tourism industry is one of the fastest growing sectors in Sabah, the tourism value and other values of ecosystems are estimated in **Appendix 3**.

6.1.2 Environmental Impact

This programme aims at the conservation of biodiversity and ecosystem in Sabah. Accomplishment of the overall goal of the Programme means positive environmental impact as mentioned in Section 6.1.1 above. There is no negative environmental impact expected at present.

6.1.3 Important Assumptions Required to the Overall Goal

See Section 5.7.1 above.

6.2 Effectiveness

6.2.1 Logicality of the Programme

The overall goal, programme purpose, project purposes, outputs, activities and important assumptions described in Chapter 5 above represent logical “means-end” relationships among them.

6.2.2 Relevance of the Programme Purpose

The programme purpose is “*Comprehensive and sustainable approach for conservation is established.*” Its achievement is measured by the compilation of the accomplishment report of the programme, as described in Section 5.2 above. The accomplishment report is expected to describes the comprehensive and sustainable approach for conservation in Sabah.

As described in Section 2.3.2, the Sabah State Government and WWF-Malaysia prepared “Sabah Conservation Strategy” in 1992. However, after 9 years of its preparation, the strategy is getting outdated. The federal government also plans to expand the biodiversity action plans for various states, following the National Policy on Biological Diversity formulated in 1998.

The achievement of the project purpose indicated by the accomplishment report is, then consistent with the needs of Sabah government and policy of the federal government. And it is feasible, if the all activities are implemented with inputs as planned.

6.2.3 Advantage of Japanese Technology

As described in Section 2.4.2 above, Japan has conducted several bilateral programs for tropical forest researches in Malaysia, and several researches on the field of ecology are conducted in Sabah (Table 2.4-2). JICA also has dispatched their experts and volunteers to ITBC-UMS, Sabah Wildlife Department, Sabah Museum, Sabah Parks and Forestry Department Sabah in recent years. These facts shows that the Japanese experts and institutes have enough technological and academic capacity to implement technology transfer to Malaysian counterparts in the Programme.

6.3 Efficiency

6.3.1 Efficiency of Inputs to Outputs and Project Purposes

The Inputs listed in Section 5.5 are necessary and sufficient for achieving the outputs and project purposes of the Components. In the Programme, resources used as the inputs and organisations provide such inputs are various. From the Japanese side, various schemes of assistance are planed to be used for the inputs, i.e. the project type technical assistance, dispatch of volunteers, the local small scale development study, financial assistance for NGOs etc. From the Malaysian side, more than ten (10) implementing organisations provide human resource, facilities, operating costs etc. as inputs. These inputs are utilised for various and comprehensive activities under the Programme, and synergetic effect

among these activities are expected to produce the outputs with high efficiency.

6.3.2 Cost - Effectiveness Analysis of the Programme

Many inputs for the specific component are expected to contribute to other components, i.e. the educational capacity of ITBC enhanced by the long-term expert and other inputs can also be utilised to train staff for other components. By such exchanges of outputs among the components, high cost-effectiveness of the inputs is expected.

6.4 Relevance

6.4.1 Appropriateness of the Programme as Official Development Assistance

The biodiversity and natural ecosystems have aspects considered as "*commons*". *Commons*, as a shortened form of "common property resources", mean resources which are beyond the exclusive jurisdiction of any particular person, but everyone may use for their own purposes.

Some values from biodiversity and natural ecosystems, i.e. their genetic value, carbon fixing function, recreational function, water holding function etc., are utilised by every person. However, particular person or organisations do not exclusively own them. Then, some benefits from the biodiversity and natural ecosystems are "external economy." There is no owner in the market of such values, who can control and maintain the values of the biodiversity and natural ecosystems. Thus, without effective alternative controls, the use of biodiversity and natural ecosystems as *commons* may increase to the point that it becomes severely depleted, contaminated, or degraded. The tendency referred to as the "*tragedy of the commons*."

To avoid the tragedy, the governmental sector should be responsible for controlling and maintaining the biodiversity and natural ecosystems. Furthermore, as the precious biodiversity and ecosystems in Sabah benefit not only people in Sabah or Malaysia but also the whole population and future generation of the world, they should be maintained as a "global commons" by international effort.

6.4.2 Consistency with JICA Country Implementation Plan for Malaysia

According to JICA Country Implementation Plan for Malaysia, the third of the four (4) aid priority sectors of JICA's technical cooperation for Malaysia is "Environmental conservation and sustainable development." In order to contribute to conserve the world's valuable natural environment in Malaysia, JICA gives one of the highest priorities in the biodiversity conservation in East Malaysia. The programme is considered as the core of cooperation in this field.

6.4.3 Consistency with Needs of Malaysia

The programme purpose and overall goal are consistent with the Malaysian policies mentioned in

Section 2.3, especially with the objectives no.3, no.4 and no.5 of the National Policy on Biological Diversity, and with the needs of the Sabah government for updating the strategy for conservation in Sabah.

6.4.4 Implementation of Participatory Planning

The problems addressed in Section 3.2.1 and the programme strategy described in Section 4 are derived from the results of seven (7) different workshops held in February to March 2001. The programme design described in Section 5 is also formulated through nine (9) workshops. The workshops are held following the participatory planning of the Project Cycle Management (PCM) method⁶. The total number of participants for the workshops are more than three hundred (300), and they are from various organisations, i.e. the implementing organisations and other governmental agencies, NGOs, local communities and private sector.

6.4.5 Appropriateness of the Implementation Structure

As described in Section 5.8 above, the implementation structure of the Programme is appropriate and clear.

6.4.6 Establishment of Monitoring and Evaluation System

The Programme shall be evaluated jointly in the third year (mid-term evaluation) and in the last six (6) months (final evaluation) of the Programme duration, and whenever else necessity arises. Monitoring will be conducted by the Working Group for each Component, based on the Plan of Operation.

Annex 5 indicates current status of the verifiable indicators for the Programme objectives. These data will be used as baseline data for the monitoring and evaluation.

6.5 Sustainability

6.5.1 Organisational Capacity

As described in Section 6.1.1, it is expected that each implementing organisation will develop its institutional capacity. And also the inter organisational set-up of the implementation structure, it is expected that the various implementing organisations will be functioning as a system for the conservation of biodiversity and ecosystem. These impacts on the institutional aspect are expected to sustain even after the Programme.

6.5.2 Financial Conditions

Table 6.5-1 indicates the budget of the leading organisations mobilised as operation costs. The impacts

⁶ Foundation for Advanced Studies on International Development (FASID). 1999. PCM: Management Tool for Development Assistance (Fourth Edition).

of the Programme is expected to be sustainable from the financial point of view.

Table 6.5-1 Operation costs of the leading organisations (RM)

Year	1998	1999	2000	2001	2002(expected)
ITBC-UMS	nd	110,949	141,000	201,000	204,960
Sabah Parks	2,400,000	2,300,000	2,300,000	2,300,000	11,300,000
Wildlife Department	nd	nd	4,000,000	nd	nd
Science and Technology Unit	240,000	85,000	190,000	190,000	190,000

6.6 Overall Project Justification

Based on the results of prior assessment above, it is concluded that implementation of the Programme is necessary and appropriate.

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Annex 1:
Programme Design Matrices (PgDM)

Programme Design Matrix (PgDM)

Programme Name: Technical Cooperation Programme for Bornean Biodiversity and Ecosystem Conservation in Sabah
 Duration: Japanese Fiscal Year 2002-2007
 Target Group: People of Sabah
 Programme Area: Sabah State
 Date: 2001/10/19 Version: 2

Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
<p>Overall goal The endangered and precious biodiversity and ecosystems of Sabah are conserved.</p> <p>Programme purpose Comprehensive and sustainable approach for conservation is established.</p> <p>Outputs for the Programme (the Project Purposes and other Outputs necessary to achieve the Programme Purpose)</p> <ol style="list-style-type: none"> 1 A monitoring system among the agencies for comprehensive conservation is enhanced. 2 <i>Project Purpose of the Research and Education Component</i> 3 <i>Project Purpose of the Park Management Component</i> 4 <i>Project Purpose of the Habitat Management Component</i> 5 <i>Project Purpose of the Public Awareness Component</i> 6 Capacities of the relevant agencies are integrated for comprehensive conservation. 7 The plan, progress and results of the Programme are made known to the public. 	<p>- Total protected areas are increased.</p> <p>- Accomplishment report is compiled by the end of the Programme.</p> <ol style="list-style-type: none"> 1.1) The meetings of the Steering Committee (once in every 6 months) and each Working Group (once in every 3 months) are held. 1.2) The Steering Committee starts operating the monitoring system by 2002. 2~5 (Refer to PDM of each Component) 6.1) Number of the research results utilised for the other component. 6.2) Number of staffs of the other Components trained at ITBC. 6.3) Changes of awareness of the communities in and around Crocker Range Park and Tabin Wildlife Reserve. 7 Number of publicity. 	<p>- IUCN Protected Area List</p> <p>- The accomplishment report</p> <ol style="list-style-type: none"> 1.1) Participants lists and minutes of Steering Committee and Working Groups meetings. 1.2) Monitoring reports. 2~5 (Refer to PDM of each Component) 6.1) a) A management plan of Crocker Range Park. 6.1) b) Management plan(s) for the selected key species 6.2) Record of ITBC 6.3) Results of Activity 5-2 of the Public Awareness Component 7 Printed and electronic media 	<p>- The Implementing Organisations follow the approach after the programme. (Assumptions of each component)</p>
<p>Activities</p> <ol style="list-style-type: none"> 1-1 Hold a meeting of each Working Group once in every 3 months. 1-2 Hold a meeting of Programme Steering Committee once in every 6 months. 1-3 Design a monitoring plan of the Programme. 1-4 Enable each Working Group to monitor implementation of Activities and achievement of Outputs and Project Purpose. 1-5 Enable the Programme Steering Committee to monitor the achievement of the Outputs, Project Purposes and Programme Purpose. <p>Activities for Outputs 2~4: (Refer to PDM of each Component)</p> <ol style="list-style-type: none"> 6-1 Utilise the educational capacity of ITBC improved through the Research and Education Component, to train staff of the other Components. 6-2 Utilise the research results of the Research and Education Component to prepare the management plans under the Park Management Component. 6-3 Utilise the research results of the Research and Education Component for the management plan(s) for the selected key species under the Habitat Management Component. 6-4 Utilise the research results of the Research and Education Component for the Public Awareness Component. 6-5 Utilise the information about local communities collected by the Park Management Component and the Habitat Management Component to refine guidelines and materials of the Public Awareness Component. 6-6 Make the staff of Implementing Organisations of the Park Management Component and the Habitat Management Component understand environmental education, by the results of the Public Awareness Component. 6-7 Hold workshops to share the results of each component by all the participating organisations of the Programme. 7-1 Science and Technology Unit publicise plan, progress and results of the Programme through printed and electronic media. 	<p>Malaysian Side (Input for each Component)</p> <ul style="list-style-type: none"> - Programme Steering Committee - Programme Director - Deputy Programme Director - Office space and administrative services by ITBC and Science and Technology Unit - Members of the Joint Evaluation Missions <p>Japanese Side (Input for each Component)</p> <ul style="list-style-type: none"> - long-term expert - Chief Advisor: 1p - Programme Coordinator: 1p - Members of the Joint Evaluation Missions. 	<p>(Assumptions of each component)</p> <ul style="list-style-type: none"> - Most members of the Steering Committee and Working Groups continue working for the implementing organisations. - New policy or enforcement of laws and regulations related to the conservation emerging after the commencement of the Programme will not contradict the programme. <p>Preconditions (Preconditions of each component)</p>	

Annex 2:
Project Design Matrices (PDMs) of Four Components

Project Design Matrix (PDM) for Research and Education Component
Project Name: Technical Cooperation Programme for Bornean Biodiversity and Ecosystem Conservation in Sabah
Project Area: Sabah State **Duration: Japanese Fiscal Year 2002-2007** **Target Group: 5 Implementing Agencies** **Date: 2001/10/19** **Version: 3**

Narrative Summary		Verifiable Indicators	Means of Verification	Important Assumptions
		<i>(Refer to the PgDM)</i>	<i>(Refer to the PgDM)</i>	<i>(Refer to the PgDM)</i>
Overall Goal The endangered and precious biodiversity and ecosystems of Sabah are conserved.				
Programme Purpose Comprehensive and sustainable approach for conservation is established.				
Project Purpose Research and education capacity for conservation of biodiversity and ecosystems of Bornean forest in Sabah is enhanced.		<ol style="list-style-type: none"> Number of publications per year by researchers shall be more than ten (10) by the end of the programme. Researches on two (2) key species in Crocker Range Park and Tabin Wildlife Reserve respectively shall be completed, and the research results shall be utilised for the protected area management. 	<ol style="list-style-type: none"> Journals, books and proceedings of workshops and seminars etc. 1) Annual reports of the implementing organisations. 2) Annual reports of the implementing organisations and the management plans of the target areas. 	
Outputs <ol style="list-style-type: none"> Linkages of implementing and related organisations are enhanced and developed. Research and training facilities at UMS and other implementing organisations are developed. Trained researcher for taxonomy and conservation biology are increased. Biodiversity and ecosystems in the target areas' are studied and better understood. Inventories and research findings are consolidated and compiled at the UMS and the relevant agencies, and to be made accessible to interested researchers, stakeholders and the public. 		<ol style="list-style-type: none"> Quarterly meeting for information exchange is held by all implementing agencies. Number of major research facilities. 1) Number of degree of Ph.D. and M.Sc. 2) Number of post graduates conducting researches in taxonomy and conservation biology in the implementing organisations. 1) Number of specimens stored. 2) Particular number of new species shall be described by the end of the programme. 3) Number of identified species in the collection prepared by the programme shall become more than 2000 species by the end of the programme. 1) Number of website pages of specimens prepared. 2) Number of the access to the website. 3) Number of reference and loans on the specimens by the researchers. 	<ol style="list-style-type: none"> a) Record of working group meeting. b) Record of "SITE" meetings. <ol style="list-style-type: none"> a) Record of installed facilities. b) Data from UMS and other implementing organisations. <ol style="list-style-type: none"> 1) Data from the universities. 2) Data from the implementing organisations. 3) Data from the implementing organisations. 4) Data from the implementing organisations. 4.1) Record on number of collection in expeditions. 4.2) Record on number of collection in expeditions. 4.2)a) Data from UMS and other implementing organisations. 4.2)b) Data from UMS and other implementing organisations. 4.3) Published papers. 4.4) Collection lists. 5.1)-5.3) Data from the implementing organisations. 	
Activities <ol style="list-style-type: none"> 1-1 Discuss on the detailed research plan for taxonomy and conservation biology among implementing organisations. 1-2 Establish protocol for collection and distribution of specimens. 1-3 JICA provides advice/ consultancy on designing research methods. 1-4 Create and upgrade communication system to provide two ways communication among implementing organisations by means of Webpages and others. 1-5 Exchange research results among implementing institutions. 1-6 Create opportunities for periodic for/ academic associations. 1-7 Hold research seminars and workshops quarterly. 1-8 Publish research journals annually. 2-1 Acquire relevant literature/ publication on taxonomy and conservation biology. 2-2 Make literature on taxonomy and conservation biology available. 2-3 Establish/ introduce database/ GIS system in ITBC-UMS. 2-4 Maintain the research facilities and equipment. 3-1 Provide training opportunities for research personnel. 3-2 Plan and run short term and medium term courses in Japan and UMS/ other institutions, including biodiversity assessment, research methodology, curatorial and data/ IT management. 3-3 Make and produce effective 'kits' for effective teachings at various level (game warden, rangers). 3-4 ITBC gets many active students. 3-5 Japanese side and Malaysian side make efforts to obtain scholarship for postgraduate students and staff. 3-6 Run taxonomic and conservation biology courses (MSc, Ph.D., BSc/ BA). 3-7 Train technical staff for equipment maintenance and operation. 3-8 Train personnel on base/ GIS system techniques. 3-9 JICA advises how to implement green auditing. 3-10 JICA provide volunteers/ experts to supervise, i.e. fieldwork/ research. 		<ol style="list-style-type: none"> 4-1 Plan faunal and floral survey. 4-2 Steering committee sets up clear and simplified research application (mechanism) to do research on the target areas. 4-3 Establish permanent research plots. 4-4 Collect specimens from the target areas. 4-5 Prepare and classify the specimens. 4-6 Identify the specimens and set up reference collections. 4-7 Conduct ecological and taxonomic studies on organisms in the target areas especially on rare/ endangered species and prioritised organisms. 4-8 Prepare species list of the target areas. 4-9 Initiate long term monitoring of species composition in relation to climate change etc. 4-10 Conduct periodical monitoring on rare/ endangered species and prioritised organisms. 5-1 Standardise specimen management. 5-2 Establish systematic system of data management. 5-3 Establish multimedia databank (video, sound, photo) of nature in the target areas. 5-4 Establish and open database of taxonomic and conservation biology information on the internet. 5-5 Organise conferences. 5-6 Make exhibition for conservation of biodiversity in ITBC. 5-7 Present research findings at the international symposium, conference etc. 5-8 Publish books on research findings and papers. 	<p>Malaysian Side</p> <ul style="list-style-type: none"> Staff Animal Taxonomy: 10p Plant Taxonomy: 10p Conservation Biology: 8p Technicians for preparing specimens (parataxonomist): 7p Librarian: 1p Research Officer: 1p Working group for the Component Administrative personnel Facilities/equipment for taxonomic and conservation biology (including those to preserve the specimen collection) Building for the research Facilities for Japanese experts (rooms and telephone etc.) Operation cost for the facilities/equipment. Cost for research and publication <p>Japanese Side</p> <ul style="list-style-type: none"> Expert - Long-term experts Systematic Biology: 1p Inventory / Museum Management: 1p Conservation Biology: 1p Short-term experts Taxonomy (Entomology, Plant, Aquatic) Field Research Forest Ecology GIS Database System Green Auditing Audio Visual IOCY (when available) Specimen Management Database Management Equipment Facilities/equipment for taxonomy and conservation biology (including those to preserve the specimen collection) and education. Partial cost for workshops and training courses. Vehicles Training Taxonomy Conservation Biology/ Field Research Curator Database Management 	<p>All findings to be published should get the written permission of the Steering Committee.</p> <p>Prerequisites</p>

1) The "Target Areas" are Crocker Range Park, Tabin Wildlife Reserve, Kulamba Wildlife Reserve, Lower Kinabatangan and Maliau Basin.

2) The long-term expert for Protected Area Management under the park management component can hold this post concurrently.

3-9) The short-term experts dispatched for the other component can hold these posts concurrently.

Overall Goal	Narrative Summary	Verifiable Indicators	Means of Verification	Important Assumptions
The endangered and precious biodiversity and ecosystems of Sabah are conserved.			(Refer to the PgDM)	(Refer to the PgDM)
Programme Purpose Comprehensive and sustainable approach for conservation is established.			(Refer to the PgDM)	(Refer to the PgDM)
Project Purpose Effective management options for protected areas are developed.			"Handbook"	
Outputs				
1 Relationship between local communities in and around the Crocker Range Park and the park management is studied and understood.		1.1) Number of options presented in essential fields, i.e. communication, public relation, fire prevention etc. 1.2) Number of illegal usage of natural resources.	1.1) Record of Sabah Parks 1.2) Record of the District Offices 2 The management plan	
2 Management plan is prepared for Crocker Range Park, taking into account of the relationship between the local communities and the park management.		2 A Management plan is endorsed. 3.1) Number of staff trained. 3.2) Number of science papers by implementing agencies.	3.1) Record of training 3.2) Publication record	
3 Capacities of the implementing organisations in managing Crocker Range Park are increased.		4.1) Number of tourist. 4.2) Complains from the public is reduced.	4.1) Visitor record of Sabah Parks 4.2) Records from District Offices	
4 Crocker Range Park is better managed.		4.3) Number of key species in Crocker Range Park. 4.4) Forest fire is reduced.	4.3) Monitoring record 4.4) Forest fire record	
5 Experience/ lessons learned through the implementation of the management plan of Crocker Range Park are analysed and compiled.		4.5) Area of forest cover around Crocker Range Park. 5 Percentage of Sabah rangers who appreciate the handbook.	4.5) Satellite image and aerial photo 5 Questionnaire for rangers	
Activities			Inputs	
1-1 Identify communities having notable impact on the park management.		3-1 Identify training needs concerning ongoing assistance on capacity building project.	Malaysian Side	Japanese Side
1-2 Study situation of the communities.		3-2 Prepare training curriculum.	- Counterparts for JICA experts	- Long-term experts
1-3 Conduct workshop/ dialogue/ discussion with communities to identify the people's need.		3-3 Train field staff of Crocker Range Park. 3-4 Organise training and seminars for staff of the HQs of the implementing organisations.	- Staff for Crocker Range Park: 50p	- Protected Area Management: 1p - Community Participation: 1p - Short-term experts
1-4 Analyse socio-economic aspects of local communities.		3-5 Provide degree/ post-graduate study opportunities for staff of implementing organisations at UMS and other universities.	- Assignment of a contact officer of each District Office	- Community participation
1-5 Study on alternatives to improve the relationship between the communities and the park management		3-6 Conduct staff exchange programme in related, protected areas in Japan.	- Social scientist for the Output	- Management/ Exhibition at the Visitor Centre
2-1 Compile existing and collect additional data and information necessary for preparation of the management plan of Crocker Range Park.		3-7 Provide exposure/ study tours for the staff of Crocker Range Park to other sites. 3-8 Review training effect and reflect the result to training plan. 3-9 Establish coordinatin mechanisms among the implementing organisations.	- GIS specialist (UMS/ Forestry Department) - Trainers	- Monitoring of Threatened Species - JOCV (when available) - Plant Ecology - Entomology - Community Development
2-2 Identify activities to be participated by the communities in and around Crocker Range Park.		4-1 Implement the management plan for Crocker Range Park, e.g. a- Establish research stations in Crocker Range Park. b- Conduct training for local communities to be tour guides in Crocker Range Park. c- Appoint honorary wildlife warden and Sabah Parks rangers from among the local communities as informers.	- GIS data informers (UMS/ Forestry Department/ Land & Survey Department) - Working group for the Component	- Local consultants for preparation of the management plan of Crocker Range Park ("Local Study") - Equipment
2-3 Document traditional knowledge, complying with the procedure under the Sabah Biodiversity Enactment 2000.		d- Encourage and implement ecotourism. e- Establish substations for control and monitoring. f- Establish conservation plan for key species, e.g. Rafflesia, big animals etc. g- Cooperate with other governmental authorities when considering any development/ land-use around Crocker Range Park.	- Administrative personnel	- Facilities of the information centre in Crocker Range Park. - Facilities for research stations in Crocker Range Park. - Vehicles - Equipment for monitoring endangered species - GIS (hardware/ software)
2-4 Refer the results of the Research and Education Component (i.e. inventory of flora and fauna).		h- Establish information centre in Crocker Range Park. i- Implement rehabilitation programme. j- Communication system for control and monitoring of Crocker Range Park is enhanced.	- Travel Allowance of Malaysian Staff - Secretarial service	- Training - Protected Area Management - Monitoring of threatened species - Management and exhibition of the visitor centre - GIS
2-5 Establish/introduce GIS/ database system for Crocker Range Park.		k- Establish and conduct long term climate monitoring research/ activities. l- Attractive facilities for eco-tourism (like canopy walk, canopy gondola) are built, which are able to use for monitoring. m- Conduct long-term ecological/ social monitoring. n- Prevent forest fires in/around Crocker Range Park.		
2-6 Map focused/threatened habitat.		5-1 Conduct interim review of the implementation of the management plan. 5-2 Hold seminar/ conference/ discussion to evaluate progress and success. 5-3 Produce records of implementation of the management plan. 5-4 Compile protected area management options as a handbook.		
2-7 Plan on facilities and trails.				
2-8 Plan ecotourism with studying carrying capacity.				
2-9 Establish zoning scheme.				
2-10 Identify problems and constraints of the conservation.				
2-11 Identify potential buffer zone areas around Crocker Range Park.				
2-12 Establish information linkage with Forestry Department Sabah for fire prevention.				
2-13 Develop a unified strategy among the related governmental agencies to address the needs of the local communities in and around the park.				
2-14 Develop the criteria for estimating the effectiveness of the management plan.				

¹⁾ The "Joint Management" means planning and implementation with participation of the community.

Narrative Summary		Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal The endangered and precious biodiversity and ecosystems of Sabah are conserved.		(Refer to the PgDM)	(Refer to the PgDM)	(Refer to the PgDM)
Programme Purpose Comprehensive and sustainable approach for conservation is established.		(Refer to the PgDM)	(Refer to the PgDM)	(Refer to the PgDM)
Project Purpose An approach to habitat management for important species is established.		- The model established by the component is employed for the other areas.	- Minutes of meeting of the working group	
Outputs		1 At least one key species is determined by 2002. 2 Manuals of the methods are compiled. 3 No. of the staff trained for the methods. 4 A distribution map is prepared. 5 Document of the management plan is published by 2007. 6 The proposal for new protected areas.	1 Preliminary report for the key species. 2 The manuals. 3 Training reports. 4 The distribution map. 5 The management plan. 6 The proposal	
Activities			Inputs	
1-1 Review existing data of the whole species, especially the protected species in Sabah.		Malaysian Side - Permanent counterpart from the Wildlife Department. - Counterparts from all other Implementing Organisations - Staff for Tabin Wildlife Reserve: 20p - Working group for the Component - Administrative personnel - GIS data informers (Forestry Department, Land & Survey Department, UMS) - Facilities for JICA experts (e.g. working rooms, direct telephones etc.) - Operating cost	Japanese Side - Long-term experts - Wildlife Management: 1p - Short-term experts - Protected Area Planning - GIS - Wildlife Biology - Animal Behaviour - JOCV (when available) - Aquatic (semi-aquatic) Animal Ecology - Terrestrial (forest) Animal Ecology - Plant Ecology Equipment - GIS (hardware/ software) - Radio/GPS tracking equipment - Vehicles (4WD) - Boats - Field equipment Training (Depend on the result of Activity 3-3)	- Existing digitised and non-digitised thematic maps and aerial photographs are available. Preconditions
1-2 Decide criteria for selecting key species.				
1-3 Select species matching the criteria.				
2-1 Refer to relevant information collected by the Research and Education Component.				
2-2 Refer to existing topographic and land-uses maps in and around Tabin Wildlife Reserve.				
2-3 Draft methods for monitoring the key species.				
2-4 Conduct preliminary field monitoring on the key species.				
2-5 Decide the monitoring methods.				
2-6 Prepare manuals of the monitoring methods.				
3-1 Identify officers, rangers, tourist guides, wildlife warden etc. involved in the monitoring.				
3-2 Identify what kind of training is necessary for them to conduct monitoring, in relation to the ongoing capacity building project.				
3-3 Formulate training module to suit the requirement.				
3-4 Conduct the training of the methods for monitoring the selected key species.				
4-1 Set up an institution for implementation of the monitoring				
4-2 Monitor the key species.				
4-3 Plot monitoring results of the key species on a map.				
5-1 Refer to relevant information collected by the Research and Education Component.				
5-2 Prepare a vegetation map in and around Tabin Wildlife Reserve, based on data from Forestry Department, UMS, Lands and Surveys Department etc.				
5-3 Verify the vegetation map by field survey.				
5-4 Comprehensive analysis of habitat requirement of key species based on the monitoring results and other maps.				
5-5 Survey human activities and requirement around Tabin Wildlife Reserve.				
5-6 Identify threats to the key species.				
5-7 Draft the management plan(s) for the selected key species.				
6-1 Identify needs to rehabilitate degraded areas around Tabin Wildlife Reserve, especially riverine habitat.				
6-2 Identify and propose the conservation of important habitat surrounding Tabin Wildlife Reserve.				

Narrative Summary		Verifiable Indicators	Means of Verification	Important Assumptions
<p>Overall Goal The endangered and precious biodiversity and ecosystems of Sabah are conserved.</p> <p>Programme Purpose Comprehensive and sustainable approach for conservation is established.</p> <p>Project Purpose People of Sabah have better understanding and appreciation to the conservation of biodiversity and ecosystem.</p>		<p>(Refer to the PgDM)</p> <p>(Refer to the PgDM)</p> <p>1) Percentage of Sabah population understanding conservation. 2) Increase membership in environmental organisations.</p>	<p>(Refer to the PgDM)</p> <p>(Refer to the PgDM)</p> <p>1) Baseline survey and post-evaluation results (Activities 2-4, 2-12) 2) Data from organisations (before and after the campaign)</p>	<p>(Refer to the PgDM)</p> <p>(Refer to the PgDM)</p> <p>- The public will participate in conservation of biodiversity and ecosystems in Sabah.</p>
<p>Outputs</p> <p>1 Current issues, problems and constraints of public awareness are identified. 2 Effective general public campaign are planned and implemented. 3 Capacity of the implementing organisations is enhanced. 4 Refined guidelines and materials are produced. 5 Awareness and understanding on nature conservation is increased in and around Crocker Range Park and Tabin Wildlife Reserve.</p> <p>Activities</p> <p>1-1 Establish a coordination office to coordinate all Activities. 1-2 Pre-test of the study (sampling number, area and field survey method) 1-3 Conduct field survey on problems and constraints in the pre-studied areas. 1-4 Study current public awareness activities in the pre-studied areas. 2-1 Identify target people (e.g. school children) of the general public campaign. 2-2 Identify necessary themes for the campaign. 2-3 Formulate a strategic plan of campaign (selection of media, media, method and schedule). 2-4 Conduct surveys to obtain baseline data 2-5 Involve the policy makers/ decision makers in the campaign. 2-6 Involve the media (radio, TV, newspaper) in the campaign. 2-7 Produce campaign materials. 2-8 Organise conferences and speeches, and conduct dialogues/ discussion. 2-9 Interact with international children's eco-tour to Sabah. 2-10 Conduct competitions of photography, essays and creative arts. 2-11 Create and upgrade the webpage. 2-12 Monitor effect of campaign on people.</p>		<p>1.1) Completion of the Problem Analysis (PCMA) on the Public Awareness on time. 1.2) Identified problems are used by the following activities. 2 Target people understand conservation and biodiversity. 3.1) Number of participants in training. 3.2) Number of trained trainers. 4 Percentage of the population in and around Crocker Range Park and Tabin Wildlife Reserve aware of the conservation. 5.1) Percentage of the population in and around Crocker Range Park and Tabin Wildlife Reserve aware of the conservation. 5.2) Number of schools and villages targeted by the awareness programme. 5-1 Test the public awareness guideline in and around Crocker Range Park and Tabin Wildlife Reserve. (Possible Activities under the guideline) a. Identify and adopt schools and villages for nature education and awareness. b. Establish a "mobile unit" that visits villages and schools around Crocker Range Park and Tabin Wildlife Reserve. c. Involve NGOs and volunteers for environmental education. d. Involve and get support of the private sector. e. Conduct environmental awareness camp. f. Conduct seminars/ talk on environmental issues. g. Study tour for target local groups. h. Conduct various competitions among school children related to conservation and ecosystem in and around Crocker Range Park and Tabin Wildlife Reserve. i. Organise seminars for journalists. 5-2 Monitor change of awareness of the people.</p>	<p>Inputs</p> <p>Malaysian Side - Coordinator at STU - C/P(s) from STU for JICA expert and JOCV volunteer on Information and Communication Technology - C/P from UMS - C/P from Public Awareness Subcommittee of Environmental Action Committee - C/P from Forestry Department - C/P from Wildlife Department - C/P from Sabah Parks - C/P from Environmental Conservation Department - Campaigners from Public Awareness Sub-committee of EAC and other NGOs (i.e. PACOS, WWF, Malaysian Nature Society, Sabah Nature Club etc.) - Rangers from Sabah Parks and Wildlife Department - Facility and Equipment working rooms, direct telephones etc.) - Operating Cost - Recurring cost for the NGOs' activities.</p> <p>Japanese Side - Long-term experts - Short-term experts - Information and Communication Technology - Multimedia - JOCV (when available) - Information and Communication Technology - Environmental Education - Training - Environmental Education (for the general public campaign) - Environmental Education (for the school children) - Equipment - Vehicle (4WD) - Information Communication Technology equipment - Desk-top Publishing equipment - Audio Visual Equipment - Partial cost when contracting out some of the activities for local consultants and NGO is necessary.</p>	<p>Department of Education cooperates and give approve for the public awareness and environmental education in the schools. - Baseline data important for formulation of guidelines and materials of the public awareness obtained sufficiently from the protected areas. Preconditions</p>