(fruits), Getah pera (rubber sapping), Belunu (fruits), Kembayau (fruits), Santol (fruits), Pisang (fruits, herbs), Pemgelaban (fruits), Bunga chempaka (flower admiration), Limau manis (fruits), Rumbia (starch making), Kelapa sawit (edible oil), Jambu batu (fruits), Langsat (fruits), Sukun (fruits), Pinjai (fruits), Matakucing (fruits) and African tulip tree (flower admiration)

There were 23 species for fruit picking, together with trees for edible oil, rubber and starch making. The survey block was about 2km in distance. More trees would be found if the survey block was to be extended.

Each house has about 10 to 20 trees on average and the housing shelter forests provide different fruits according to the season.

Boats are the only transportation means from Batang Duri to the entrance to the National Park. Mixed Dipterocarp forests originally grew in this block as in the forests of the National Park. The forests were also used for living by people and as a place for production. Mixed Dipterocarp forests, shifting cultivation and their secondary forests can be found in this block.

Jetty Forest:

This forest is a bank forest near a jetty in front of longhouses, community houses of about 200 residents at Batang Duri.

Here the longhouse residents wash their clothing or take a bath in the morning and in the evening, fish for the dining table, and children played in the water. On both banks of the river, large trunks of Keruing neram, which is the principal species of the banks of the Temburong River grow horizontally, reflecting shadows of trees on the gentle stream which spreads across the entire width of the river. This is the living space of bank forests hanging with crimson Ara flowers and which supports the traditional lifestyle of the people of Batang Duri.

Big Menggaris:

Soon after leaving the jetty, shifting cultivation can be viewed ahead. One Menggaris tree stands aloof from nearby trees in a forest on the right of the farmland. This tree leads the people imagine how tall the trees in the National Park will be.

Big Ranggu:

Rock terraces in the process of formation are located on the opposite bank to the shifting cultivation. These terraces were formed after dark gray

and weathered bedrocks were eroded by the river stream. Changing direction to the right while viewing these rock terraces and after continuing upstream for some time, a big Ranggu tree stands 45m high with a large orchid stump rooted halfway up its trunk. It was decided to confer this tree with the title "Big."

Shifting Cultivation Secondary Forest:

Shifting cultivation and secondary forests regenerated during the fallow period of cultivation, can be seen in many places along the next section of the river. The point shown in Figure-51 was considered typical of such forest. The principal species were Sengkuang, Merkubung and Sedaman. These species were 8 to 10 years old, but tree heights were less than 10m. The initial growth could not be considered to be fast.

Huge Menggaris:

More splendid forests appear as the National Park is approached. A Huge Menggaris stands prominently in one of these forests. Many Menggaris trees grow in the National Park, but they can also be found in the lowland area.

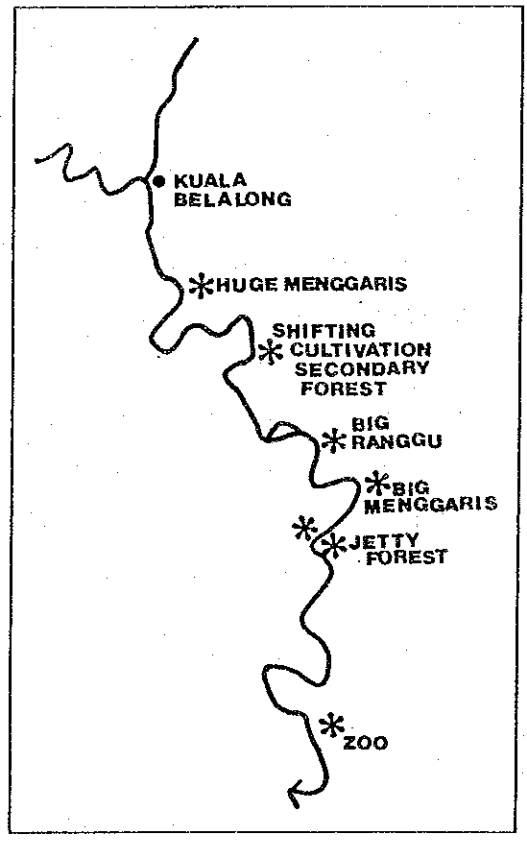

Figure-51 View points from Jetty to Kuala Belalong

7. Utilisation Facilities Plan

7.1. Approach to Plan for Facility Utilisation

The primeval tropical rain forests existing in the Ulu Temburong National Park are very valuable for the world, not only because they are large in size, but also in terms of the composition of standing trees in the forests. Thus, it will be very significant to open the National Park to ecotours. On the other hand, adverse effects to the existing natural ecosystem are also possible if many people visit the National Park. Therefore, ecotours must be conducted after establishing sufficient protection, management and operation plans to maintain the existing, unspoiled nature of the Ulu Temburong National Park.

The topography inside the National Park is steep, according to the results of the field survey so far. At the moment, however, the slopes and forests in it are judged to be stable. It is feared that large-scale development of facilities for ecotours could lead to the destruction of the present natural ecosystem, topography and other factors, and must be avoided. Therefore, the facilities to be used for ecotours of the National Park must be planned under an absolute condition that upper- and middle-storey trees will not be cut. The facilities to be built must be of a scale of a necessary but minimal limit.

The locations of facilities to be built will be planned based on the ecotour routes and must be decided after taking the above matters fully into consideration. The scale and structures of the facilities must blend suitably with the local environment (match to nature). It will be effective to plan the facilities using materials that can be procured in the Temburong area.

As an installation policy, the ecotour facilities will be planned to a necessary and minimal scale so that the nature of the Ulu Temburong National Park will not be damaged. The facilities must be such that ecotour tourists will be able to use them with a sense of assurance. The facilities to be built are as follows:

- Management facilities
- Nature trails
- Viewing and observation facilities
- Rest facilities
- Public toilets

- Jetties
- Lodging facilities
- Signs and information boards

7.2. Utilisation facilities plan

7.2.1. Management facilities

Areas adjacent to, but outside of the National Park are designated in the Temburong area as production forests and trees are cut there even now. Secondary forests and reclaimed land are located along the Temburong River from Batang Duri to the entrance to the National Park and trees may be cut in the future up to the entrance to the National Park. Felling of trees in the forests along the Temburong River will damage landscapes viewed from a boat between Batang Duri and the National Park during ecotours. In Brunei Darussalam, fields are control burnt before planting trees when preparing sites, and this may affect the forests of the National Park. Felling of trees upstream of Batang Duri must be avoided as much as possible.

Considering these factors and to protect, manage and operate the 10,000 ha of land inside the Ulu Temburong National Park to be used for ecotours, as well as to manage and guide the tourists, management facilities will have to be installed inside the area.

The management facilities will mainly handle the following:

- Records of visitors.
- Distribution, display and explanation of National Park brochures.
- Guiding tourists.
- Procurement and management of boats and operators.
- Emergency procedures.
- Guidance of, and communications with, tourists.
- Stores.
- Litter disposal.

The scale of the management facilities is expected to be large when the foregoing is considered. Land for these management facilities on this scale, cannot be obtained inside the National Park, unless trees are cut. The management facilities should be installed outside the National Park but as

near as possible to the National Park. Flat land about 0.5 ha in area is located about 200m downstream from the entrance to the National Park (confluence of Sg. Belalong) on the right bank and this site is considered suitable.

7.2.2. Nature trails

(1) Day trips

Nature trails for day trips for ecotours are planned to be a route to the Apan Observation Point and a route from the Sg. Belalong confluence at the entrance to the National Park for forest observation. The landscapes viewed from the Apan Observation Point are specially splendid and this route is expected to become the main route for ecotours and to attract many visitors. Adequate nature trails must be built.

Steep topography exceeding 80% in grade is found in many places inside the National Park, and the existing footpaths are mainly built along the ridges. Longitudinal slopes on many footpaths along the ridges exceed 40% and bypass routes with a grade of about 20% (11°) were studied where such steep grades continued for a long time.

At present, the Apan footpath uses an existing route along a ridge. Many parts along this route have steep longitudinal slopes and this route up as a nature trail will present problems. For this reason, an alternative route was selected.

The existing footpath near the Apan start point (BP~IP.12) reaches a ridge with an altitude difference of about 54 m by a direct route and in some places the longitudinal slope along this route exceeds 80%. Walking was very difficult, and it was decided to change the route. The alternative route had an average longitudinal slope of about 30%. Steeper places could be by-passed by extending the length, and this route was selected.

The existing footpath in the block between IP.26 and IP.45 also had many up and down sections. The grade exceeded 40% in many parts, and it was decided to change the route. The average longitudinal slope of the new route was about 20%. However, staircases and catwalks will have to be built in some places due to the topography of the passing points and for safety reasons.

The existing footpath should preferably be repaired, such as by building

staircases on some parts, for the return route from the Apan Observation Point. As a nature trail, it provides access to more tropical rain forests with easy walking, because most parts of it are downhill.

The existing footpath can be fully utilised for the nature trail along the forest observation route at the entrance to the National Park except that some repairs, such as providing catwalks will have to be undertaken in some parts of the route alongside the Temburong River.

(2) Lodging-type routes

The main track for the lodging-type trip will be the route to climb Bt. Belalong. This will be an excursion route that will utilise the existing footpath built by the UBD, and a new track to be built between Bt. Belalong and the confluence of Sg. Machang. It has been decided that basically the route will pass along ridges. Steep sections will be bypassed to set a route that will have gentle longitudinal slopes allowing easy walking. Only trees that are not protected (smaller than 6m) will be cut.

In planning nature trails, sections with longitudinal slopes of more than 20° (37%) will have staircases. Sections with longitudinal slopes of more than 35° (70%) will be provided with catwalks. Water draining facilities will be provided to disperse water where rainwater accumulates.

Figures-52 to 54 show examples standard of earthworks for nature trails and of the standard construction of staircases and catwalks.

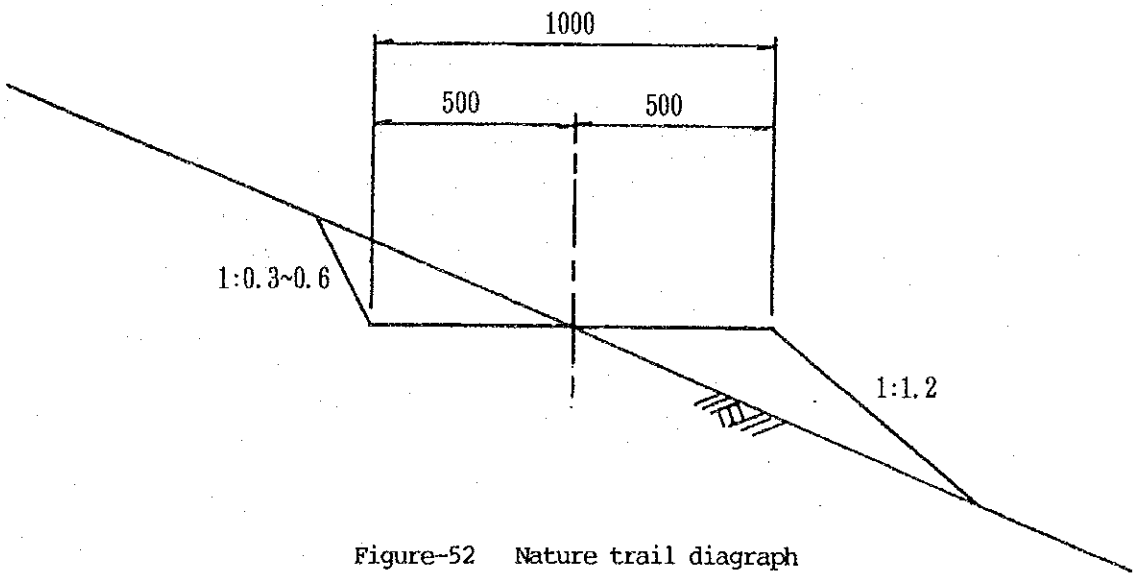

Figure-52 Nature trail diagraph

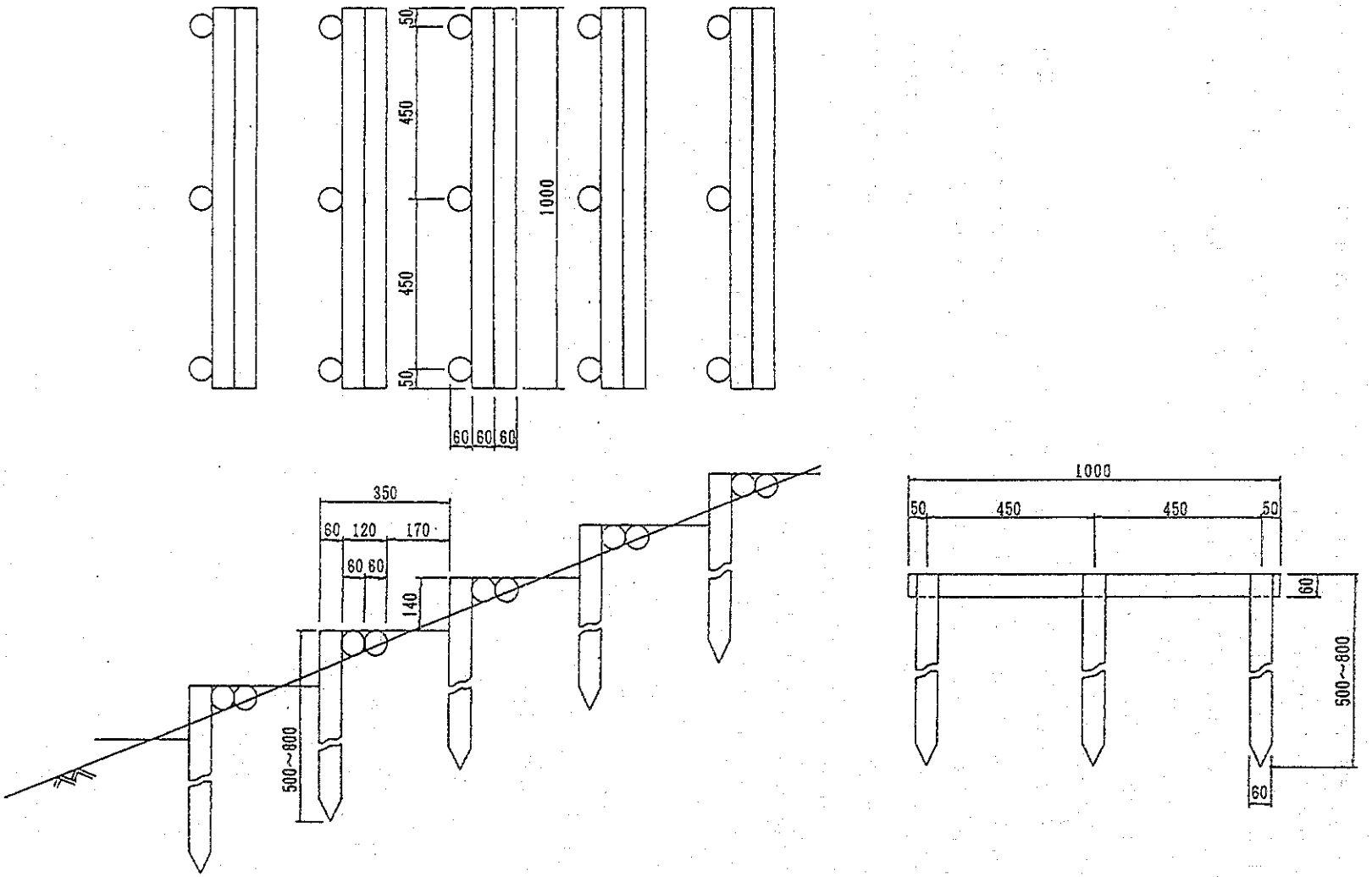

Figure-53 Standard construction of staircase

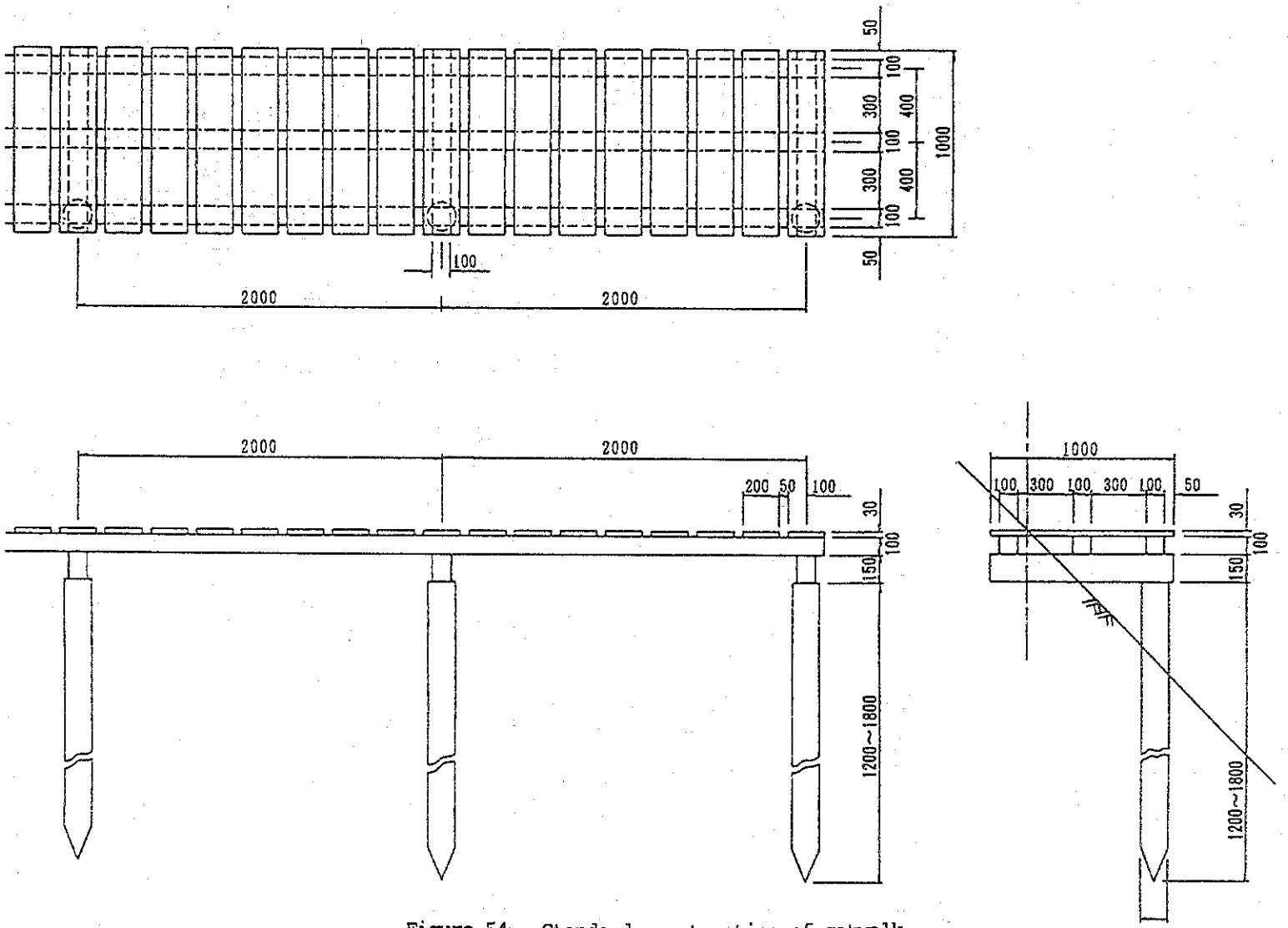

Figure-54 Standard construction of catwalk

7.2.3. Viewing facilities

At the Apan Observation Point, trees around the signal point for aerial photography were already cut when the signal was installed by the Survey Department. This point commands views over 360° and is expected to become one of the main attractions for ecotours. It is anticipated that many people will visit it to enjoy nature and landscapes. Trees here have been cut and it does not have a shade of trees. A shade facility should preferably be built to provide a place for resting. The standard and structure of this facility should be a timber building that blends with landscapes of the site.

A viewing facility has been planned at the Bt. Belalong Observation Point, 913m in altitude, similar to that at the Apan Observation Point.

7.2.4. Rest facilities

Rest facilities such as shelters, cabins, and benches should be provided along the nature trails and the Temburong River to allow ecotour visitors to better familiarise themselves with nature.

Splendid huge trees of the tropical rain forest can be viewed along the nature trails of the route to the Apan Observation Point. Rest facilities have been planned near IP.12, 26, 40, A25 and A1 to enable full observation of these trees. These rest facilities should have a roof to provide shelter from rains.

The situation is the same for the forest observation route at the entrance to the National Park. However, one rest facility at IP.J1 near the end of the footpath would be sufficient.

The journey along the Temburong River from the entrance of the National Park to the confluence of Sg. Machang will require about one hour in each direction. Rest facilities will be built near the confluence of Sg. Machang and near the midway point. These facilities will be used as shelter cabins during rains.

The excursion route to Bt. Belalong is planned to have rest facilities every 3 to 4km.

7.2.5. Public toilets

Ecotour visitors will naturally include females and separate public toilets for males and females have been planned. These toilets should preferably be

installed next to management or other facilities.

7.2.6. Jetties

Jetties should be built to assure safe and pleasant boat boarding and mooring for ecotour visitors. Jetties should preferably be built close to management facilities, nature trails or other facilities. Jetties will be built in the following six locations to match the survey results obtained so far and to take the tour routes into consideration:

- Entrance to the National Park
- Location where the management facility will be built
- Confluence of Sg. Machang
- Confluence of Sg. Apan
- Confluence of Sg. Babi
- Near the UBD nature trail to Bt. Belalong

7.2.7. Lodging facilities

Lodging facilities are necessary and indispensable for lodging-type trips. The Bt. Belalong excursion routes will require two or three nights lodging. Lodging facilities (mountain cabins) must be built in at least three places. The lodging facilities will be built on flat land near the nature trail.

A campground can be considered in the area to enable ecotour visitors to familiarise themselves with and enjoy nature for a longer time. Such a campground should preferably be provided outside the National Park, but near the management facilities.

7.2.8. Signs and information boards

Signs and information boards must be installed at various places to provide ecotour visitors with a better understanding of the nature of the Ulu Temburong National Park, and the actual condition of tropical rain forests. Signs and information boards will provide the visitors with a sense of security to freely select routes at the site.

Each tour facility will always have signs and information boards and typical trees will have name tags and descriptive boards.

7.3. Facilities Site

7.3.1. Facilities site to be used as a management and activities base in the National Park

Nature trails, viewing and observation facilities, rest facilities, jetties, signs and information boards, will have to be installed inside the National Park area. These facilities will make the observation of nature within National Park possible and will help to maintain an orderly flow of visitors in the Park.

With regard to the management and lodging facilities, these should preferably be installed outside the National Park area, in order to avoid any damage to the primitive nature of the National Park forest. Since these facilities will provide the management and activities base, the installation should be close to the Prk entrance. As described previously, the ideal site for these facilities is the flat spot of 0.5ha, on the right bank, 200m downstream from the National Park entrance. However, given that the number of visitors could increase considably in future, a further expansion of the facilities site may be necessary. In looking for an appropriate site for this purpose, the right riverbank inside the Park at Kuala Belalong provides suitable level land. It may be inevitable to choose this location as a second best policy, provided such a provision is limited to only this one place inside the National Park area.

7.3.2. Considerations required for the facilities site at Kuala Belalong

(1) Objectives and contents of the survey

The facilities inside the National Park will require to have more consideration given to minimising impacts on the environment, than those outside the National Park. It will also be necessary to ensure the safety of visitors using the lodging facility. Surveys of the forest stand structures of the two sites scheduled for the campsite and for the construction of facilities, were conducted. The objectives of the survey were to clarify matters requiring environmental consideration, and to ensure the safety of the facility construction sites inside the Park at Kuala Belalong. Figure-55 shows a plan of the survey area by topographic surveying.

(2) Campsite

Architectural structures are not planned for the campsite. It is not

planned to be modify the land either. However, trees comprising the surface horizon and some of the trees in the shrub layer (6 to 10m in tree height) will have to be cut to provide amenity as a campsite. Figure-56 and 57 show the forest stand structures of the proposed campsite. A large space needed to install architectural structures will not be necessary and impacts on the forest ecosystem will be slight.

Possible accidents caused by falling branches from emergents (more than 41m in tree height) and by falling trees must be prevented to ensure safety of the users of the campsite and the facilities scheduled to be built. This will require the following precautions:

1) Lianas growing at the site and in its immediate vicinity must be cut.

2) Large trees (21 to 40m in tree height) and small (11 to 20m) tree layers, should be preserved whenever possible to avoid falling branches from emergents (more than 41m in tree height) falling directly on the users.

3) Brent roots must not be damaged or removed.

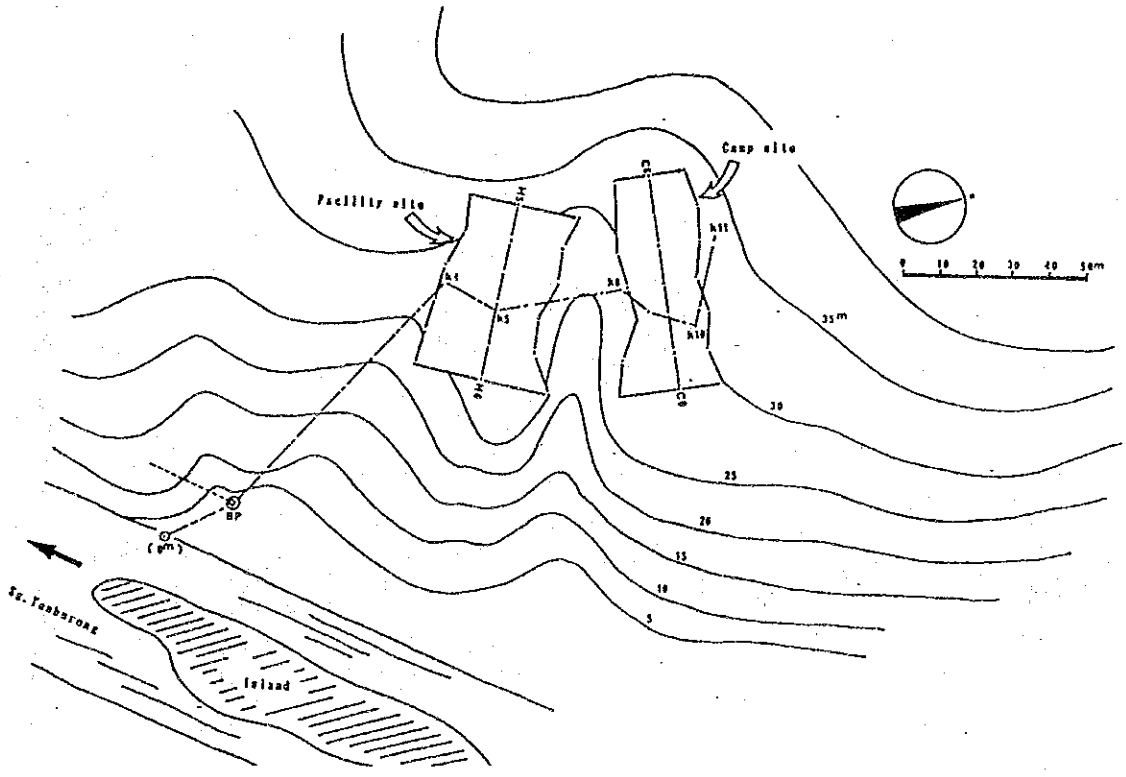

Figure-55 Survey plan of campsite and facility site

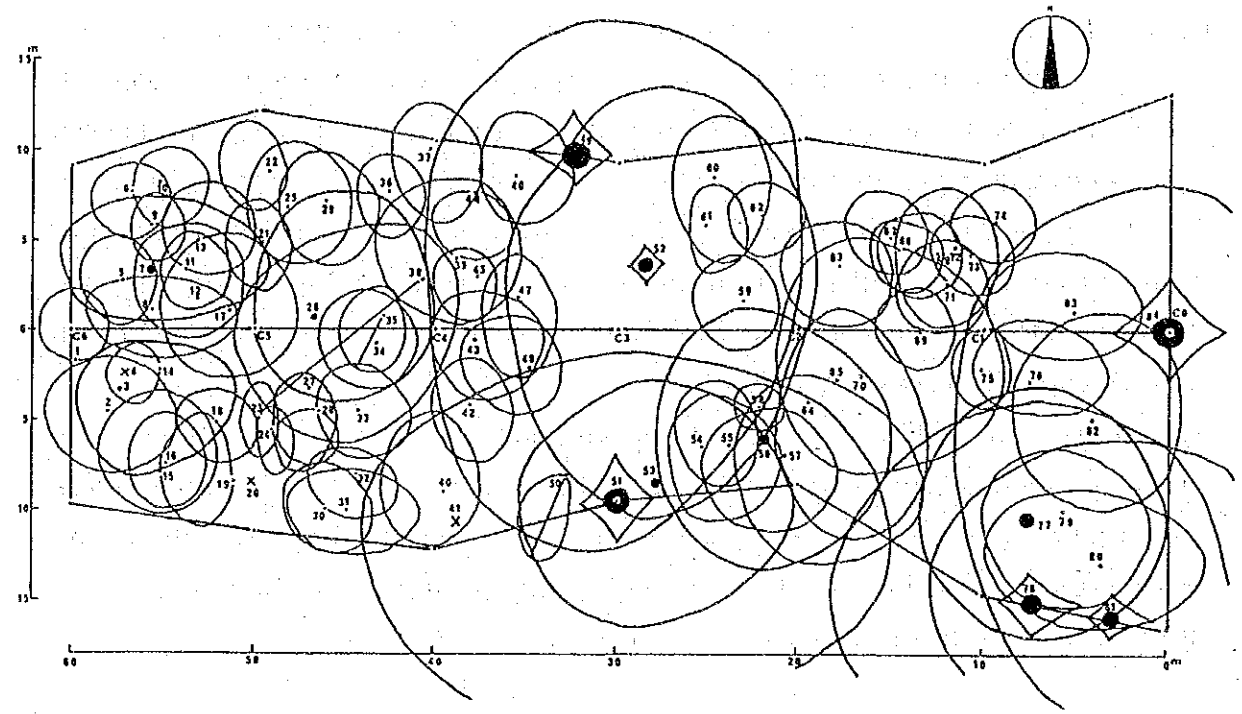

Figure-56 Crown projection diagram of campsite

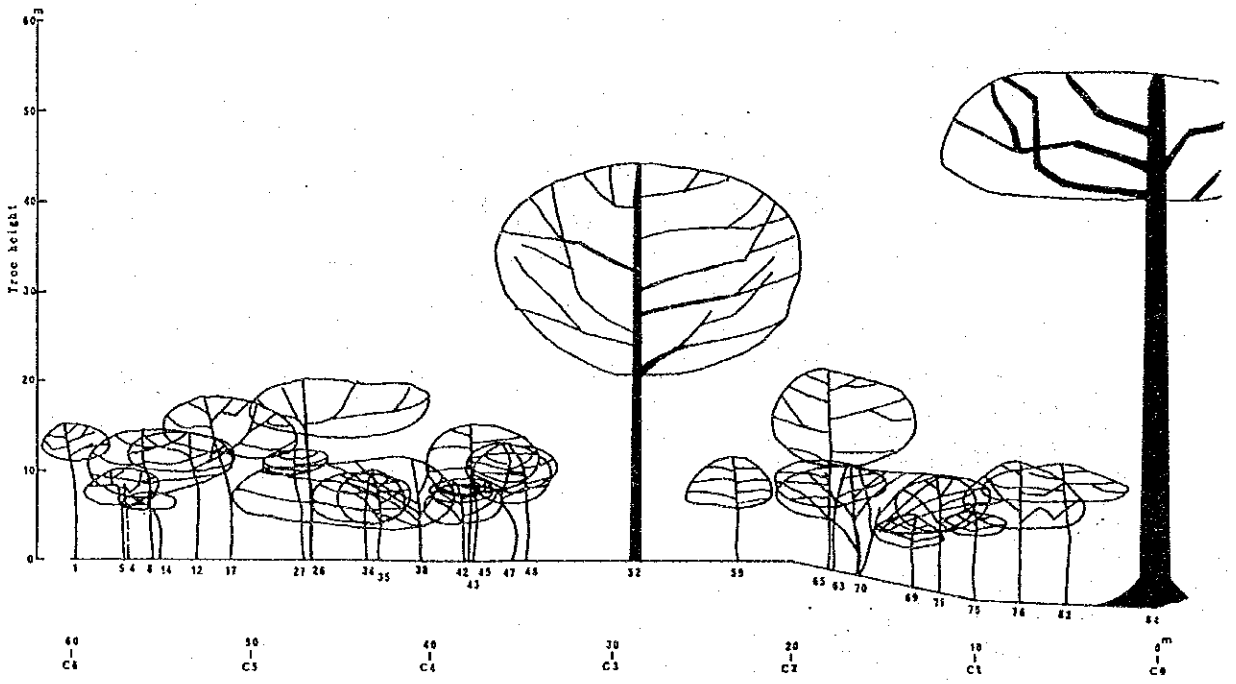

Figure-57 Forest profile diagram of campsite

(3) Facility site

The site scheduled for the various facilities including the hostel is relatively flat, and land stability will not be damaged if a construction method that does not alter the land surface, such as a high-floor architectural method is used.

However, cutting of trees will be inevitable if architectural structures are to be built. A study of how the impact on the forest environment can be minimised, by studying what size range of trees should be cut and where structures should be built, will be important. What is most important in maintaining the forest ecosystem, is to preserve forest spaces with a crown closure as they are.

If sufficient land can be obtained by cutting only those trees forming the surface horizon, it is preferable that only these trees should be cut. Generally, however, land to build facilities on cannot be secured merely by cutting trees of this size. As a rule, a study is made to determine whether land can be secured by cutting trees in the shrub layer and below.

Nearly all the zones in the survey area are covered by canopies formed by emergents. To simplify the explanation, this is not included in the consideration. A study is made of the relationship between tree cutting and changes in crown closure, affecting only canopies of the tree layers below the large tree layer, which are affected by tree cutting for the architectural structures.

Figure-58 shows the canopy projections formed by trees in forests below the large tree layer assuming that all trees below 20, 15, 12 and 10m are cut in A, B, C and D, respectively.

If all trees below 20m are cut, 44.1% of the survey area will no longer be covered by trees below the large tree layer. If all trees below 15m are cut, 26.9% of the survey area will no longer be covered by trees below the large tree layer. Similarly, 24.0% and 23.6% will no longer be covered if all trees below 12m and 10m are cut. The canopy opening will become smaller, the lower the tree heights of the trees to be cut.

Therefore, the site should be selected assuming that trees below 10m in tree height forming the shrub layer will be cut when architectural facilities are built inside the survey area. The canopy opening in the forests will be almost

the same when trees below 10m and 12m are cut. Therefore, trees below 12m can also be cut.

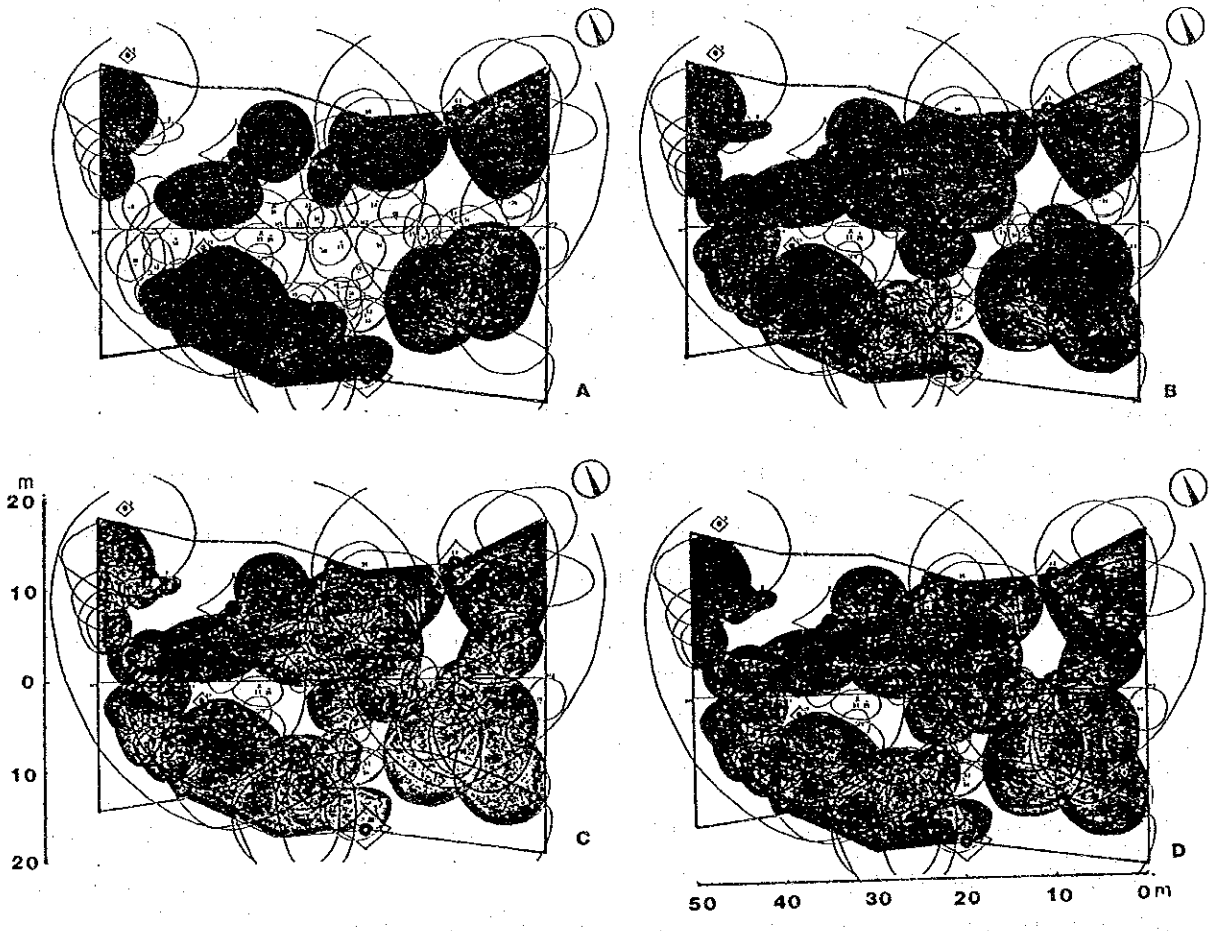

Figure-58 Crown projection diagram of facility site (except emergent)
A:cutting all trees less than 20m height
B:cutting all trees less than 15m height
C:cutting all trees less than 12m height
D:cutting all trees less than 10m height

Next, the site selection and site size will be studied.

Figure-59 shows the positions of all the trees more than 6m in tree height growning in the survey area.

Regarding to buildings, especially accommodation facilities, longhouse architecture (bigger than 8m x 24m size) has been considered. Assuming that only trees below 10m and withered trees are cut, construction sites could be only A, B or C as shown on the map.

Sites A and B measure 9.0m x 9.0m and C, 8.5m x 8.5m. Three buildings each about 8.0m x 8.0m in area can be built on these sites. Therefore, it is desirable to divide the hostel into three smaller buildings.

Under this scheme, trees to be cut at Site A will be five trees, namely, Belian (H 9m, DBH 8cm, unknown species (H 9m, DBH 9cm), Pendarahan (H 7m, DBH 6cm), Mempisang (H 8m, DBH 6cm) and Nelunak (H 9m, DBH 6cm). Two withered trees will also be cut. Cutting of trees at Site B will not be necessary. At Site C, four trees will be cut, namely, unknown species (H 10m, DBH 9cm), unknown species (H 9m, DBH 4cm), unknown species (H 9m, DBH 4cm) and Sireh sireh (H 7m, DBH 7cm).

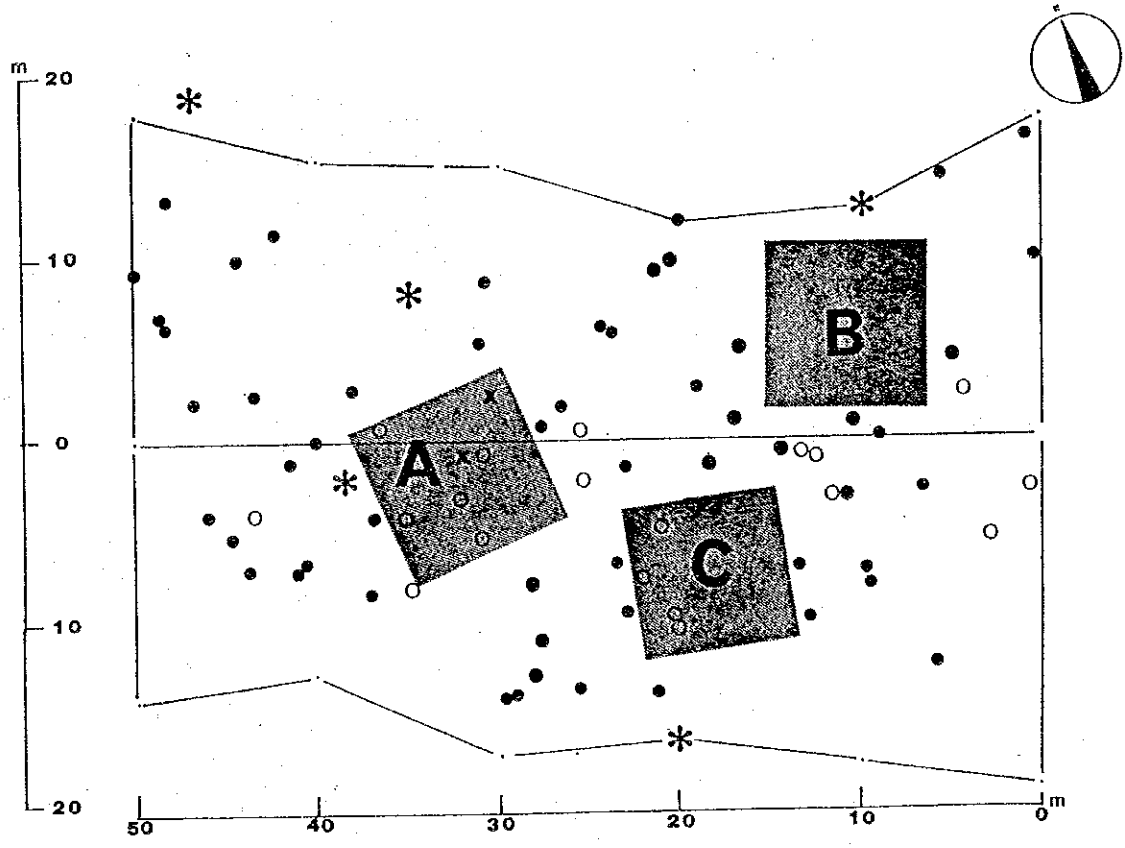

Fig. Ⅲ-7(8) Position of trees in facility site
✳ : more than 41m height, ● : 11 ～40m height, ○ : 6～10m height
✕ : dead tree, : suitable site for facility

Figure-59 Positions of trees in facility site

Figure-60 shows the vertical distribution of light intensity in tropical rain forests. According to this diagram, the relative light intensity is expected to increase by less than 2 or 3% in the forests adjacent to the construction sites selected in the above study.

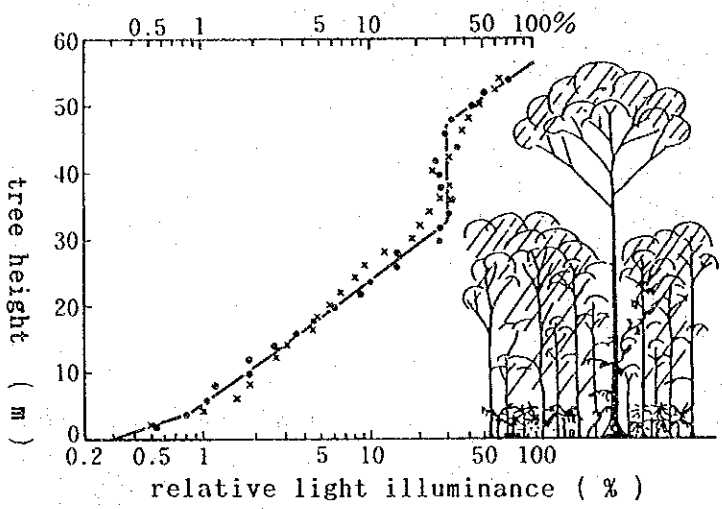

Figure-60 6ertical distribution of light intensity in a tropical rainforest of West Malaysia

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Appendices

App.Table-1 Monthly rainfall (each day)

Place: Kuala Belalong Unit:mm

YEAR:	1992				1993						Total
Day/Month	9	10	11	12	1	2	3	4	5	6	
1		7.0	37.0	0.5	---	1.0	8.5	12.0	0.5	---	
2		13.0	142.0	---	---	---	3.0	---	75.0	20.5	
3		8.5	***	---	---	---	16.5	---	1.0	11.5	
4		92.0	***	0.5	---	0.5	17.5	2.0	23.5	19.0	
5		---	***	23.0	0.5	12.0	19.0	77.5	22.5	7.5	
6		16.0	***	30.0	---	3.5	31.0	3.0	71.0	23.0	
7		0.5	***	0.5	---	10.5	---	0.5	22.5	---	
8		8.0	***	9.5	---	2.5	---	1.5	7.0	12.5	
9		---	***	1.5	14.5	29.5	7.5	1.0	---	---	
10	2.0	7.5	***	4.5	1.0	44.0	7.0	---	28.0	---	
11	2.5	1.5	***	---	---	1.5	17.5	---	42.5	---	
12	---	1.0	***	22.0	3.0	3.0	65.5	---	14.0	---	
13	---	28.0	***	12.5	---	25.0	66.0	---	23.0	---	
14	---	51.0	***	---	---	10.5	---	42.5	11.5	---	
15	16.0	12.5	***	---	23.5	---	---	16.5	2.0	---	
16	35.0	14.0	***	---	52.0	---	---	28.5	2.5	---	
17	0.5	20.5	5.5	0.5	20.5	---	---	3.0	57.5	---	
18	---	0.5	57.0	4.5	3.0	8.5	---	1.0	9.0	---	
19	---	4.0	9.0	11.0	27.0	1.0	---	10.0	22.5		
20	---	0.5	1.0	1.0	26.5	---	---	12.5	4.5		
21	29.5	9.5	0.5	41.5	8.5	---	---	9.5	44.5		
22	---	5.0	85.0	---	---	---	---	7.5	2.5		
23	---	---	---	9.5	---	14.0	---	1.0	3.5		
24	28.5	17.0	27.0	0.5	0.5	1.0	---	49.5	0.5		
25	9.0	19.0	9.0	5.5	---	25.0	9.5	17.0	4.0		
26	51.0	0.5	21.0	2.0	---	---	11.0	4.0	---		
27	3.5	2.0	---	2.5	---	8.5	7.0	18.0	0.5		
28	4.0	18.0	18.5	105.5	0.5	11.0	17.0	43.5	45.5		
29	30.5	13.5	---	33.0	---		0.5	16.0	3.5		
30	30.5	3.5	7.0	---	---		20.5	---	40.0		
31		---		---	---		5.5		37.0		
Total	242.5	374.0	419.5	321.5	181.0	212.5	330.0	377.5	621.5	94.0	3,174.0
Max. (Day)	51.0	92.0	142.0	105.5	52.0	44.0	66.0	77.5	75.0	23.0	142.0
Max. (Hour	26.5	69.5	49.0	37.0	18.5	22.5	42.0	35.0	65.5	13.5	69.5
Num. of rainy day	13	27	13	22	13	19	18	23	29	6	183
Num. of observ.	21	31	16	31	31	28	31	30	31	18	268

Note ***:No observation ---:No rain

App.Table-2 Daily rainfall (each hour, Sept. 1992)

Place: Kuala Belalong

Month: Sept. 1992

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
2	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
3	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
4	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
5	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
6	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
7	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
8	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
9	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	0.5	---	---	---	---	---	---	---	---	2.0	1.5
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	---	---	---	---	---	---	---	2.5	2.5
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	12.0	2.0	---	---	---	---	---	---	16.0	12.0
16	---	---	6.0	3.0	1.0	---	---	---	---	---	---	---	---	---	---	---	19.0	3.0	3.0	---	---	---	---	---	35.0	19.0
17	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
21	2.0	26.0	1.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	29.5	26.0
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	21.0	7.5	---	---	---	---	---	---	28.5	21.0
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	3.0	---	4.5	---	---	---	9.0	4.5
26	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	26.5	11.5	8.5	2.0	1.5	---	---	---	---	---	51.0	26.5
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.0	0.5	---	3.5	3.0
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	0.5	0.5	0.5	0.5	---	---	---	4.0	2.0
29	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	3.0	7.5	1.0	4.0	5.5	4.0	0.5	4.0	0.5	---	30.5	7.5
30	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	0.5	18.0	6.0	0.5	0.5	1.0	---	1.0	2.5	---	30.5	18.0
TOTAL																									242.5	26.5

Note ***:No Observation ---:No Rain

App.Table-3 Daily rainfall (each hour, Oct. 1992)

Place: Kuala Belalong

Month: Oct. 1992

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	---	1.0	3.5	1.0	---	---	---	---	7.0	3.5
2	1.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	---	10.5	---	---	---	---	---	13.0	10.5
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	3.5	3.0	1.5	---	---	---	8.5	3.5
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.5	1.5	69.5	1.5	2.5	5.0	5.0	3.0	0.5	92.0	69.5
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	0.5	0.5	2.5	11.0	1.0	---	---	---	---	---	16.0	11.0
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	0.5	0.5
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8.0	---	---	8.0	8.0
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	2.0	3.5	1.0	0.5	---	---	---	7.5	3.5
11	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	0.5	---	---	0.5	---	---	---	---	---	---	1.5	0.5
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	0.5	1.0	0.5
13	1.5	4.5	0.5	---	---	---	---	---	---	---	---	---	---	---	14.5	4.5	2.5	---	---	---	---	---	---	---	28.0	14.5
14	---	---	---	---	---	---	0.5	---	---	21.5	5.0	0.5	---	---	---	---	2.5	2.5	5.0	0.5	3.5	1.5	2.0	6.0	51.0	21.5
15	5.0	3.5	0.5	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	2.0	1.0	12.5	5.0
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11.0	3.0	---	---	---	---	---	---	---	---	14.0	11.0
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.5	4.5	0.5	1.0	---	---	---	---	---	20.5	14.5
18	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.5	0.5	---	---	---	---	---	---	4.0	3.5
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	0.5	0.5
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7.5	---	---	---	---	---	---	0.5	1.5	---	9.5	7.5
22	3.0	2.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5.0	3.0
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	4.0	5.5	0.5	0.5	---	---	---	---	---	---	---	---	---	---	0.5	---	6.0	---	---	---	---	---	17.0	6.0
25	---	2.0	---	---	---	---	---	---	---	---	---	---	15.5	1.0	0.5	---	---	---	---	---	---	---	---	---	19.0	15.5
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	0.5	0.5
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	1.0	0.5	2.0	1.0
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.0	6.5	1.0	0.5	18.0	10.0
29	1.0	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	10.5	1.5	---	---	---	---	---	---	---	13.5	10.5
30	---	---	---	---	---	---	---	3.0	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.5	3.0
31	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total																									374.0	69.5

Note ***:No Observation ---:No Rain

App.Table-4 Daily rainfall (each hour, Nov. 1992)

Place: Kuala Belalong

Month Nov. 1992 Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	26.5	7.0	1.5	2.0	---	---	---	---	---	37.0	26.5
2	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	16.5	49.0	44.0	15.0	1.5	---	5.0	10.5	142.0	49.0
3	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
4	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
5	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
6	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
7	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
8	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
9	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
10	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
11	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
12	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
13	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
14	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
15	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
16	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***	***
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	3.0	2.0	---	5.5	3.0
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.5	6.5	17.5	18.0	0.5	---	---	---	---	---	57.0	18.0
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7.0	2.0	---	---	---	---	---	---	---	---	9.0	7.0
20	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	1.0	0.5
21	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5	---	21.0	38.0	16.0	8.0	1.0	---	---	85.0	38.0
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	7.0	11.0	6.0	0.5	27.0	11.0
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	6.0	---	---	0.5	0.5	---	---	---	9.0	6.0
26	---	---	---	---	---	---	---	3.5	---	---	---	1.0	0.5	3.0	---	5.5	7.0	0.5	---	---	---	---	---	---	21.0	7.0
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	15.0	---	---	---	0.5	1.5	---	0.5	---	---	18.5	15.0
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	1.5	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	3.5	1.5	---	---	---	---	7.0	3.5
Total																									419.5	49.0

Note ***:No Observation ---:No Rain

App.Table-5 Daily rainfall (each hour, Dec. 1992)

Place: Kuala Belalong

Month: Dec. 1992

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	0.5	0.5
5	---	---	---	---	---	---	---	---	---	---	---	---	3.5	9.0	1.0	2.0	2.5	2.5	2.0	0.5	---	---	---	---	23.0	9.0
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	1.0	---	---	6.0	22.5	---	30.0	22.5
7	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.0	6.5	---	9.5	6.5
9	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5	---	---	---	---	---	---	---	1.5	0.5
10	---	---	---	---	---	---	---	---	---	---	---	1.0	---	---	---	---	---	2.5	0.5	0.5	---	---	---	---	4.5	2.5
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	21.5	0.5	---	---	---	22.0	21.5
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	1.5	0.5	9.5	0.5	---	---	---	12.5	9.5
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	0.5	0.5
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	3.5	---	---	---	4.5	3.5
19	---	---	---	---	---	---	---	---	---	1.5	---	---	---	3.0	3.0	1.5	0.5	1.0	0.5	---	---	---	---	---	11.0	3.0
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	0.5	---	---	1.0	0.5
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4.0	14.0	3.0	8.0	2.5	0.5	---	4.5	0.5	4.5	41.5	14.0
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
23	7.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	1.5	---	---	---	---	---	9.5	7.0
24	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	3.0	---	---	---	---	---	---	---	---	5.5	3.0
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	1.0	---	---	---	---	---	2.0	1.0
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5	---	---	---	---	1.5	---	---	2.5	1.5
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	25.5	10.0	---	---	12.5	37.0	1.5	18.5	0.5	---	105.5	37.0
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	6.0	2.0	25.0	---	---	---	33.0	25.0
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total																									321.5	37.0

Note ***:No Observation ---:No Rain

App.Table-6 Daily rainfall (each hour, Jan. 1993)

Place: Kuala Belalong

Month: Jan. 1993

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.5	0.5	4.5	---	---	---	---	---	---	14.5	9.5
10	---	---	---	---	---	---	---	---	0.5	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	1.0	0.5
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	0.5	---	---	---	0.5	---	---	---	---	3.0	2.0
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	18.5	4.0	---	0.5	---	---	---	---	23.5	18.5
16	---	---	---	---	---	---	---	---	---	---	---	---	---	6.0	10.0	10.0	5.0	5.0	10.0	2.0	1.0	1.5	0.5	1.0	52.0	10.0
17	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	4.0	7.5	7.5	0.5	---	---	0.5	---	---	---	20.5	7.5
18	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	1.5	1.0	---	---	---	---	---	---	---	---	3.0	1.5
19	---	---	---	---	---	---	---	---	---	---	---	---	---	4.0	8.0	13.0	1.0	0.5	0.5	---	---	---	---	---	27.0	13.0
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8.0	7.5	10.0	0.5	0.5	---	---	---	26.5	10.0
21	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	3.5	4.5	---	---	---	---	---	---	---	---	8.5	4.5
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL																									181.0	18.5

Note ***:No Observation ---:No Rain

Place: Kuala Belalong

App.Table-7 Daily rainfall (each hour, Feb. 1993)

Month: Feb. 1993

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	---	---	---	---	1.0	1.0
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	0.5	0.5
5	---	---	---	1.0	9.0	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	1.0	---	---	12.0	9.0
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	2.5	0.5	---	---	---	---	---	---	3.5	2.5
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	3.0	0.5	2.0	3.0	0.5	---	---	10.5	3.0
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	---	---	---	---	---	2.5	2.5
9	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	0.5	---	---	4.0	17.0	3.0	3.0	0.5	---	29.5	17.0
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	22.5	9.5	2.5	6.5	2.0	0.5	0.5	---	---	---	44.0	22.5
11	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	0.5	---	0.5	---	---	---	---	---	---	1.5	0.5
12	---	---	---	---	---	1.5	0.5	---	---	---	---	---	1.0	---	---	---	---	---	---	---	---	---	---	---	3.0	1.5
13	---	---	---	---	3.5	2.0	0.5	2.0	3.0	9.5	0.5	---	---	---	---	2.5	---	---	---	---	---	1.5	---	---	25.0	9.5
14	---	---	---	---	---	---	---	10.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10.5	10.5
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8.0	0.5	---	---	---	---	---	---	---	8.5	8.0
19	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	1.0	0.5
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
23	0.5	---	---	---	---	---	---	---	---	---	---	---	---	1.5	2.0	0.5	---	8.5	---	---	---	0.5	0.5	---	14.0	8.5
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	---	---	---	---	---	---	1.0	1.0
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14.5	2.5	7.5	0.5	---	---	---	25.0	14.5
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	6.5	---	1.0	---	0.5	8.5	6.5
28	7.5	2.5	0.5	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	11.0	7.5
Total																									212.5	22.5

Note ***:No Observation ---:No Rain

App.Table-8 Daily rainfall (each hour, Mar. 1993)

Place: Kuala Belalong

Month Mar. 1993

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	7.0	1.0	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8.5	7.0
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	0.5	---	---	---	---	---	---	---	---	3.0	2.5
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8.0	0.5	---	---	---	---	---	5.5	2.5	16.5	8.0
4	1.5	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.0	1.5	---	4.0	1.0	---	---	---	17.5	9.0
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8.5	4.5	---	3.5	2.5	---	---	---	---	19.0	8.5
6	0.5	---	---	---	0.5	0.5	3.5	2.5	0.5	---	---	---	---	---	---	---	6.5	16.0	0.5	---	---	---	---	---	31.0	16.0
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	6.0	---	0.5	0.5	---	---	---	7.5	6.0
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7.0	---	---	---	---	---	---	7.0	7.0
11	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	1.5	---	---	14.5	1.0	---	---	---	---	17.5	14.5
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	24.5	11.5	5.0	9.5	0.5	---	12.0	1.5	1.0	---	65.5	24.5
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	42.0	5.0	---	1.0	9.0	4.5	0.5	2.0	0.5	66.0	42.0
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---	---	3.0	---	---	---	---	---	3.0	3.5	---	---	---	9.5	3.5
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	2.0	1.0	2.5	2.0	---	0.5	---	1.0	0.5	11.0	2.5
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	6.0	---	0.5	---	---	0.5	7.0	6.0
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.0	2.5	5.5	---	---	---	17.0	9.0
29	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.0	3.0	2.0	2.5	---	---	---	---	---	---	20.5	13.0
31	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	---	---	---	2.5	---	---	---	---	5.5	2.5
Total																									330.0	42.0

Note ***:No Observation ---:No Rain

Place: Kuala Belalong

App.Table-9 Daily rainfall (each hour, Apr. 1993)

Month: Apr. 1993

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	2.0	1.0	---	---	---	---	---	---	---	---	---	---	6.0	2.5	0.5	---	---	---	---	---	---	12.0	6.0
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	---	---	---	---	---	2.0	2.0
5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	20.5	10.5	19.0	20.0	5.0	1.0	1.5	---	77.5	20.5
6	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	---	0.5	---	---	---	---	---	3.0	2.0
7	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	0.5	---	---	---	---	---	---	---	---	1.5	1.0
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	0.5	---	---	1.0	0.5
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	29.5	1.5	0.5	1.0	---	3.0	5.5	1.5	42.5	29.5
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.0	6.0	1.0	---	0.5	---	16.5	9.0
16	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	26.5	1.5	---	---	---	---	28.5	26.5
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	---	---	0.5	---	---	3.0	2.5
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	---	---	---	---	---	---	---	1.0	1.0
19	---	---	---	---	---	---	---	---	2.5	1.0	0.5	---	---	---	---	---	---	2.0	2.0	2.0	---	---	---	---	10.0	2.5
20	---	---	---	---	1.0	---	---	---	---	---	---	7.5	4.0	---	---	---	---	---	---	---	---	---	---	---	12.5	7.5
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	9.0	0.5	---	---	---	---	---	---	---	9.5	9.0
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	6.5	1.0	---	---	---	---	---	---	---	7.5	6.5
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	---	---	---	---	1.0	1.0
24	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	12.5	32.0	5.0	---	---	---	---	49.5	32.0
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	1.5	0.5	---	1.0	12.5	17.0	12.5
26	1.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	2.5	---	4.0	2.5
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.0	14.5	---	---	---	0.5	---	---	---	18.0	14.5
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	7.5	35.0	0.5	---	0.5	---	---	---	43.5	35.0
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	15.5	---	0.5	16.0	15.5
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total																									377.5	35.0

Note ***:No Observation ---:No Rain

App.Table-10 Daily rainfall (each hour, May. 1993)

Place: Kuala Belalong

Month: May 1993

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	---	---	---	0.5	0.5
2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	65.5	7.5	---	---	---	---	---	---	---	75.0	65.5
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5	---	---	---	---	---	1.0	0.5
4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	20.0	3.5	---	---	---	---	---	---	---	23.5	20.0
5	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	2.0	20.0	---	---	---	---	---	---	---	22.5	20.0
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	61.5	9.0	---	---	---	---	---	---	---	71.0	61.5
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.0	1.0	8.0	---	0.5	---	---	---	---	22.5	13.0
8	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	0.5	---	4.5	---	---	---	---	---	---	---	7.0	4.5
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	3.0	---	---	---	8.0	2.0	---	---	5.0	4.5	---	---	---	---	---	---	4.0	0.5	0.5	0.5	28.0	8.0
11	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	3.0	27.0	5.5	1.5	0.5	2.5	1.5	0.5	---	---	42.5	27.0
12	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	8.0	4.0	1.0	0.5	---	---	---	---	---	---	14.0	8.0
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	22.0	0.5	0.5	---	---	---	23.0	22.0
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4.0	3.5	1.5	2.0	0.5	11.5	4.0
15	0.5	---	0.5	---	---	---	---	---	---	---	---	---	---	---	0.5	---	0.5	---	---	---	---	---	---	---	2.0	0.5
16	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	---	---	---	---	---	---	0.5	---	---	---	2.5	2.0
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	46.5	2.0	1.0	8.0	---	---	---	---	57.5	46.5
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	6.5	2.5	---	---	---	---	---	---	---	---	9.0	6.5
19	13.5	3.0	5.5	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	22.5	13.5
20	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	0.5	---	---	2.0	---	---	4.5	2.0
21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	12.5	31.5	0.5	---	---	---	---	---	---	---	44.5	31.5
22	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	0.5	---	---	---	---	---	---	---	2.5	2.0
23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.5	---	---	---	---	---	---	2.0	---	3.5	2.0
24	---	---	---	---	0.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	0.5
25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	0.5	---	---	---	1.0	---	---	---	---	4.0	2.5
26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	---	---	0.5	0.5
28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.5	43.0	---	---	---	---	45.5	43.0
29	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	---	---	2.5	---	0.5	---	---	3.5	2.5
30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8.5	---	---	21.0	10.5	---	---	---	---	---	40.0	21.0
31	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	2.5	2.0	6.5	15.5	5.0	5.0	---	37.0	15.5
Total																									621.5	65.5

App.Table-11 Daily rainfall (each hour, Jun. 1993)

Place: Kuala Belalong
Month: Jun. 1993

Unit:mm

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total	Max.
1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	4.5	---	---	---	---	---	---	---	---	---	---	0.5	2.0	2.0	4.5	1.5	1.5	0.5	---	1.5	1.5	0.5	20.5	4.5
3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.0	---	---	5.5	1.5	---	0.5	3.0	11.5	5.5
4	13.5	3.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2.0	---	0.5	---	---	---	---	---	19.0	13.5
5	---	---	---	0.5	0.5	---	---	1.0	---	---	---	0.5	---	3.0	---	1.0	1.0	---	---	---	---	---	---	---	7.5	3.0
6	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.5	11.0	11.0	0.5	---	---	---	---	23.0	11.0
7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	2.0	3.0	2.5	---	---	---	1.0	0.5	---	3.5	---	---	---	---	---	12.5	3.5
9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---														
20																										
21																										
22																										
23																										
24																										
25																										
26																										
27																										
28																										
29																										
30																										
Total																									94.0	13.5

App.Table-12 Monthly rainfall (1971～1990)
at Selangan agriculture station

SOURCE: DEPARTMENT OF AGRICULTURE
MINISTRY OF INDUSTRY AND PRIMARY RESOURCES
NEGARA BRUNEI DARUSSALAM

Station:Selangan

District:Temburong

Yr./Mon.	JAN.	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
1971			306.32	167.13	431.80	162.05	175.51	658.88	488.44	402.34	406.40	830.58	4,029.45
1972	498.10	167.60	257.60	324.90	267.20	360.20	10.90	245.40	167.10	604.80	581.70	228.50	3,709.00
1973	105.20	109.70	326.40	441.20	336.60	601.00	417.60	311.90	628.90	464.10	383.60	490.70	4,616.90
1974	338.10	354.10	277.60	404.10	299.00	202.70	291.60	254.50	522.00	160.50	399.80	440.70	3,944.70
1975	519.40	224.00	200.70	315.20	173.70	146.60	495.10	149.90	689.40	265.70	250.20	551.70	3,981.60
1976	560.60	201.60	201.60	158.80	397.60	210.70	309.10	176.00	506.40	179.50	280.00	50.90	3,232.80
1977	696.10	669.40	372.80	366.50	591.60	431.40	347.20	169.40	115.90	412.30	574.50	414.30	5,161.40
1978	268.10	166.70	397.00	311.40	545.10	263.10	355.60	68.60	278.70	415.90	483.10	383.00	3,936.30
1979	40.60	313.10	262.50	345.50	350.70	771.70	264.50	288.40	723.80	464.90	898.70	464.00	5,188.40
1980	523.10	229.10	124.00	301.10	345.80	472.30	421.00	366.30	213.30	430.40	576.10	833.90	4,836.40
1981	439.20	215.40	209.40	395.00	542.60	272.80	351.10	18.80	469.90	182.40	712.50	346.20	4,155.30
1982	363.00	154.10	245.80	609.20	285.78	164.90	221.00	245.60	137.60	388.30	428.30	343.60	3,587.18
1983	251.50	150.30	32.20	267.60	331.40	236.10	318.60	305.20	331.40	265.40	512.40	745.00	3,747.10
1984	658.60	475.20	139.90	407.50	547.90	218.00	309.10	17.50	464.00	353.40	443.90	523.10	4,558.10
1985	370.90	203.00	259.70	421.40	784.00	107.60	305.90	83.70	329.10	588.60	430.30	295.60	4,179.80
1986	303.00	251.90	408.40	508.20	341.70	310.70	189.70	283.30	309.30	695.90	519.00	141.40	4,262.50
1987	89.70	192.00	243.60	259.50	566.10	415.50	195.05	289.80	241.90	325.10	341.70	636.30	3,796.25
1988	449.00	227.80	386.70	370.90	363.30	109.00	366.20	727.10	572.80	274.20	469.10	624.40	4,940.50
1989	233.00	394.50	279.50	258.60	476.20	207.90	297.50	250.20	381.30	273.10	450.20	177.00	3,679.00
1990	223.60	174.70	229.30	338.10	227.00	209.40	151.20	90.80	423.00	466.60	431.40	110.40	3,075.50
Max.	696.1	669.4	408.4	609.2	784	771.7	495.1	727.1	723.8	695.9	898.7	833.9	5188.4
MIN.	40.6	109.7	32.2	158.8	173.7	107.6	10.9	17.5	115.9	160.5	250.2	50.9	3075.5
AVERAGE	364.78	256.54	258.05	348.59	410.25	293.68	289.67	250.06	399.71	380.67	478.65	431.31	4,161.96

App.Table-13 Daily rainfall(1989)at Selangan agriculture station

Station: Selangan

District: Temburong SOURCE: Selangan Agriculture Station

Day＼Month	JAN	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.	
1	7.3			49.6	0.2				76.1	25.6	2.6		
2	12.8		22.8		11.2	18.2	54.3			11.0			
3	15.7					4.2	42.2						
4		3.5		23.4	63.2	13.4			3.6				
5					44.5		1.4			9.6	39.3		
6		10.7				9.2	10.0	1.9			27.2		
7	3.6	2.2	8.1	45.2		1.5	50.3						
8				37.8		4.4				21.7		9.6	
9		11.2		26.3		22.5			4.7		22.2		
10				5.6	83.8		1.1	22.5	2.6	10.8	11.5		
11	3.7	3.2		11.2	5.4		7.4		3.4	12.5	79.3		
12		1.2	40.1	3.1						1.8	8.3		
13		1.0			13.4			3.9		1.2	54.5		
14		7.3	30.8	16.3		21.0	24.3		4.5	16.4	11.1		
15		2.4				15.3	15.4	2.3		12.8			
16		115.9				31.5	31.0	22.4		12.8	52.5		
17		3.2			31.8		1.6			17.0			
18	20.3					1.4		22.4	4.8	3.6	7.7		
19	32.0		0.6		5.3		0.4	15.0	9.2	26.7	1.3	22.0	
20		13.8		12.0	22.3	3.5				6.2	6.8	7.1	
21	76.5	27.0	24.0		28.5	12.4		3.1	14.0		11.0	8.6	
22	19.0	34.0	42.5		14.9				6.8	2.2	21.8	37.9	
23	30.6							40.5	20.4			22.9	
24	1.5		69.0			1.9			35.1		38.1		
25		35.9					2.0	58.6	58.6		11.1	21.7	
26		5.3					56.1	17.3	50.3	8.5	34.1	21.9	
27		80.5							8.9	4.5		22.1	
28	10.0	36.2			11.2	47.5		5.0	66.4	11.4	3.9	3.2	
29			34.7		15.3			14.3		56.8	5.9		
30			6.9	28.1				15.0	11.9				
31					125.2			6.0					Year
Total	233.0	394.5	279.5	258.6	476.2	207.9	297.5	250.2	381.3	273.1	450.2	177.0	3,679.0
Max.	76.5	115.9	69.0	49.6	125.2	47.5	56.1	58.6	76.1	56.8	79.3	37.9	125.2
Days	12	18	10	11	15	15	14	15	17	20	20	10	177

App.Table-14 Daily rainfall(1990)at Selangan agriculture station

Station: Selangan

District: Temburong SOURCE: Selangan Agriculture Station

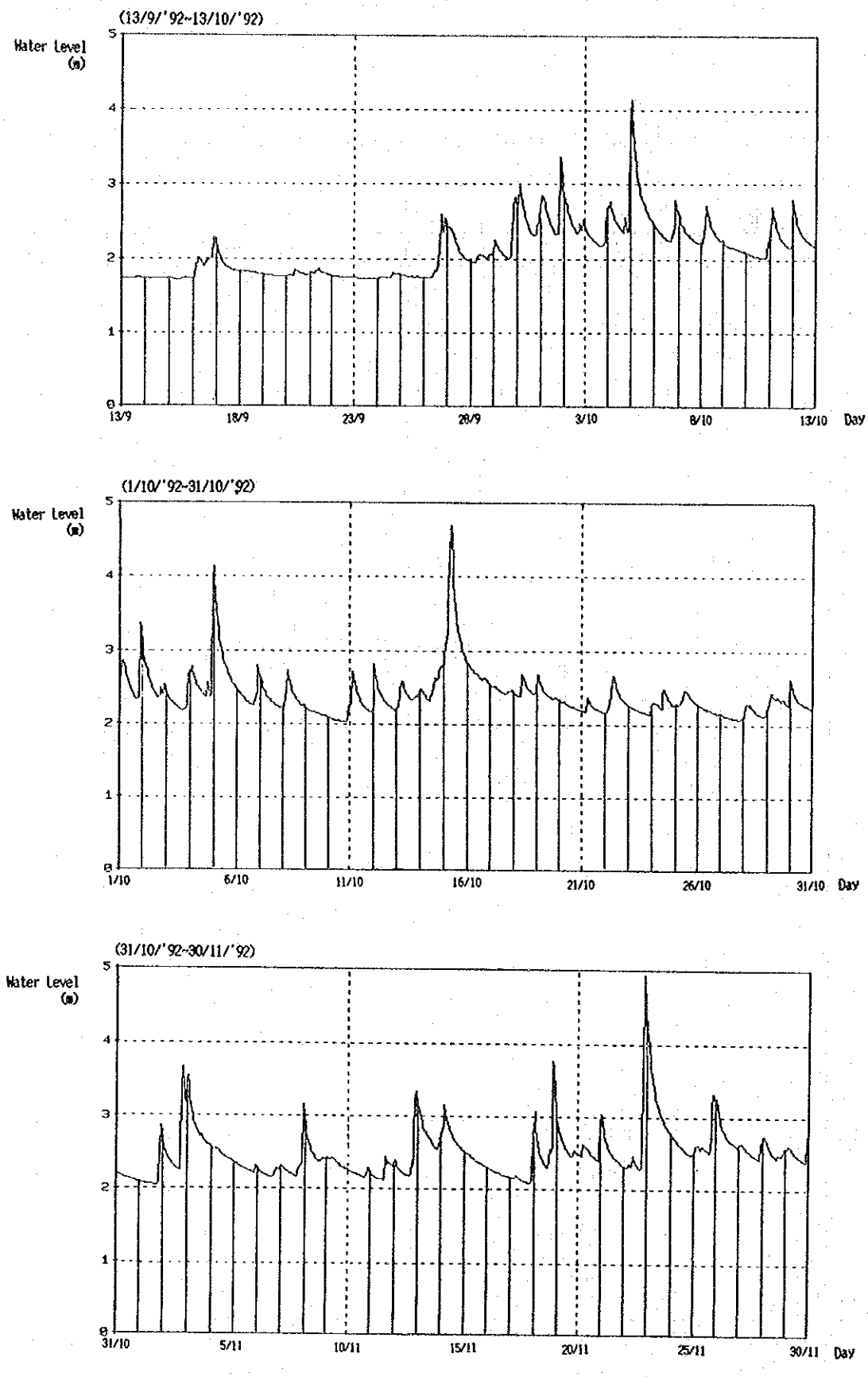
Day＼Month	JAN	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.	
1		34.3		10.0	1.0				30.5	4.6	18.6		
2		2.6		15.1	9.8				34.0				
3		5.9		35.2	79.2	12.3			29.3		47.6		
4	3.8	8.4			4.7			23.7	3.5		26.4		
5	25.0		2.2			24.6		5.9	23.9		3.1	4.9	
6	18.5		6.9	16.3	5.8	33.3					11.0	1.7	
7					2.7	3.8				5.7		7.0	
8	12.6			14.4	25.4	12.4			3.9		3.2	9.9	
9					17.8	15.6					6.0	10.5	
10			19.0	4.1	31.5	45.1	2.1	22.4			2.4		
11	25.3			104.2				17.5		18.8	2.4	7.3	
12	0.6			28.4	1.8	3.5	59.0				3.6	3.5	
13					8.2	10.0	14.7			18.5	42.5		
14				7.0	5.9					71.9		4.6	
15		12.6		13.0	1.8			6.4		1.1	10.0		
16	3.0	53.4	10.0	5.6	2.6		50.9	4.2	3.5			46.9	
17	45.9											9.4	
18	2.8	49.2	10.9		16.6				50.8				
19	16.4	2.0	7.0			7.4				15.2	4.2		
20	40.6		39.2			9.2				3.8	70.5	3.3	
21				21.2			3.3				13.3		
22				34.2			8.4		121.7	6.0	30.5		
23				1.9					15.2	43.3	19.2		
24				6.8		16.0		10.2	12.9	32.5	66.1		
25	6.5		10.4	3.2	8.5				6.5	21.4	23.3		
26	7.5		33.5					0.5		4.5	6.3		
27	3.7		9.1			16.2			61.5	40.0			
28		6.3		1.5					21.8	23.5	21.2		
29			78.0	10.3						23.2			
30	1.6		3.1	5.7			2.8		4.0	55.0		1.4	
31	9.8				3.7		10.0			77.6			Year
Total	223.6	174.7	229.3	338.1	227.0	209.4	151.2	90.8	423.0	466.6	431.4	110.4	3,075.5
Max.	45.9	53.4	78.0	104.2	79.2	45.1	59.0	23.7	121.7	77.6	70.5	46.9	121.7
Days	16	9	12	19	17	13	8	8	15	18	21	12	168

App.Table-15 Daily rainfall(1991)at Selangan agriculture station

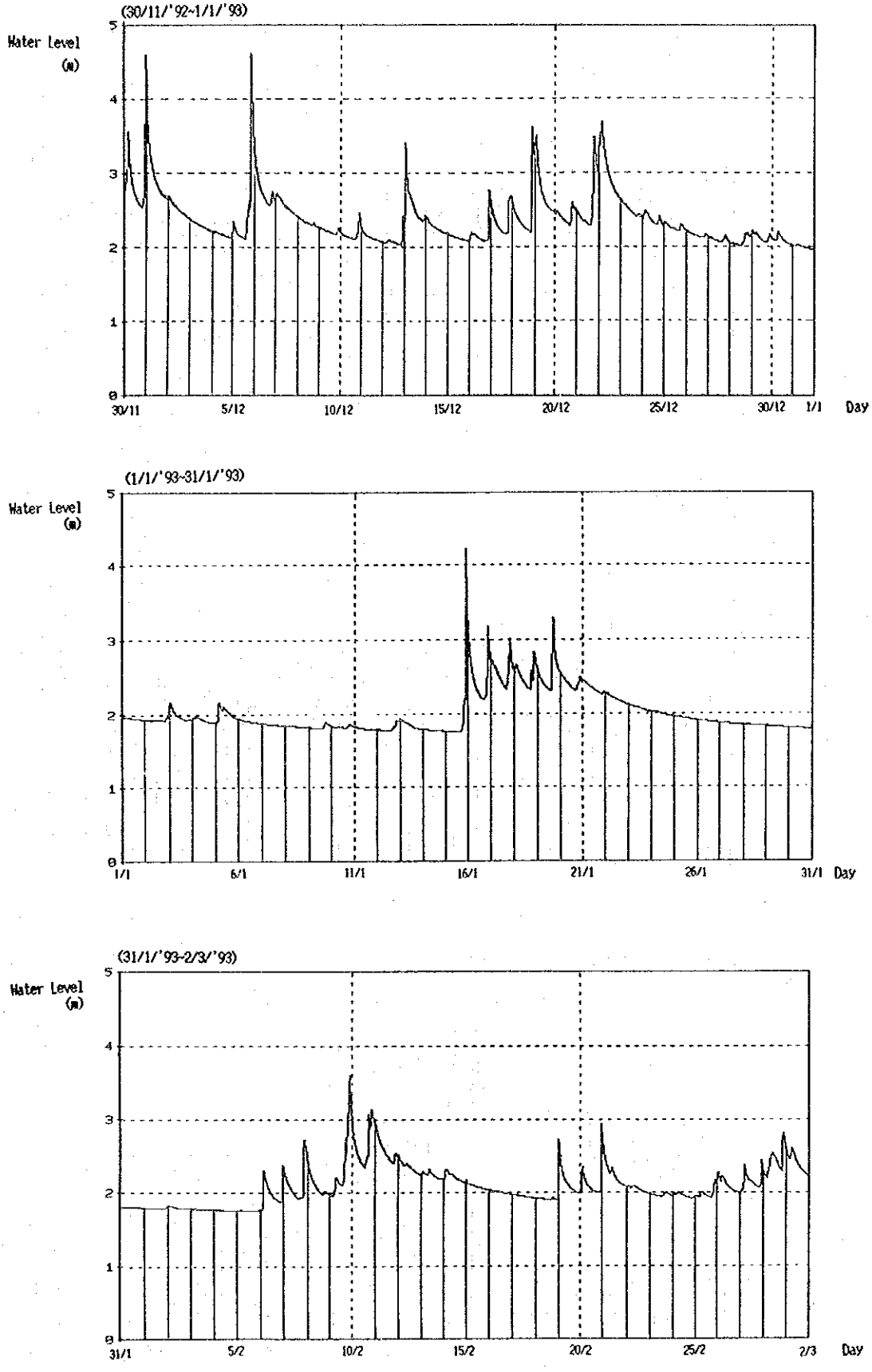
Station: Selangan

District: Temburong SOURCE: Selangan Agriculture Station

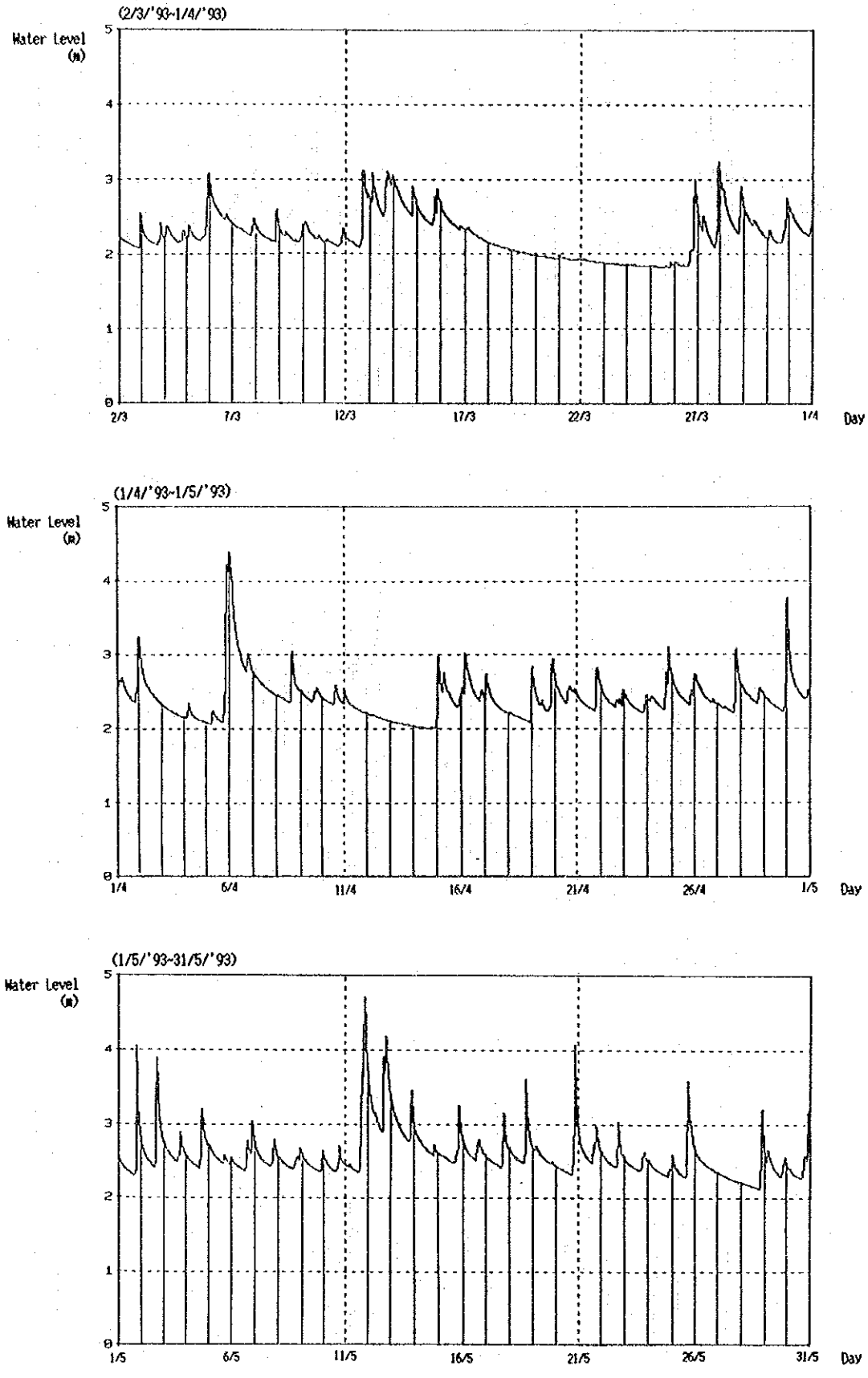
Day＼Month	JAN	FEB.	MAR.	APR.	MAY.	JUN.	JUL.	AUG.	SEPT.	OCT.	NOV.	DEC.	
1					18.7	33.5				3.5			
2		12.1		20.9	2.9	8.3	34.7		21.2		4.2	18.6	
3		32.9		7.7		21.4	4.0				10.0		
4			8.9	14.8	60.0	41.4	14.0		57.3				
5					44.6		21.0						
6				42.6	7.9	66.6	5.9		11.9		10.7	12.3	
7				33.1	58.1		2.2		9.5		41.2	2.4	
8					17.9		4.4	25.3					
9		2.6		17.9					3.6		52.0		
10				5.6	1.0				2.4		20.6		
11		4.2						21.5			11.5	12.9	
12		33.0		15.8				10.3			3.0	14.0	
13		31.1		51.6							142.9	16.8	
14		2.2		8.7					13.2	10.7	14.5		
15	4.5	5.2		6.5					2.0	42.7			
16		42.7	2.1		5.1				1.7		9.6		
17			2.2		22.9		8.9			121.6	52.1		
18	2.7		32.3	14.3	4.5					38.9	41.0	25.9	
19	1.6			144.7					52.7	6.2	23.3	39.1	
20	21.2			1.7	6.7		28.7		8.1	42.8	11.3		
21	8.9			3.5	4.8			9.9		1.7	101.7	2.0	
22	2.7	55.3	6.8	7.2	113.5	80.3			7.1				
23			22.9	39.1	1.4			19.7	38.7	18.3	66.1		
24				16.1	95.0		10.0				5.9	8.2	
25			40.3	58.5	9.2						47.9		
26	7.0		2.9	18.2					39.6	8.2	27.9	7.0	
27	1.7			35.6	11.2	3.0						39.0	
28						14.0			13.9	12.0		37.5	
29	31.9		4.4	11.7		15.2						4.5	
30	1.4		7.5		7.5					35.6	16.0		
31	56.0		9.6		5.0			6.2					Year
Total	139.6	221.3	139.9	575.8	497.9	283.7	133.8	92.9	282.9	342.2	713.4	240.2	3,663.6
Max.	56.0	55.3	40.3	144.7	113.5	80.3	34.7	25.3	57.3	121.6	142.9	39.1	144.7
Days	11	10	11	22	20	9	10	6	15	12	21	14	161



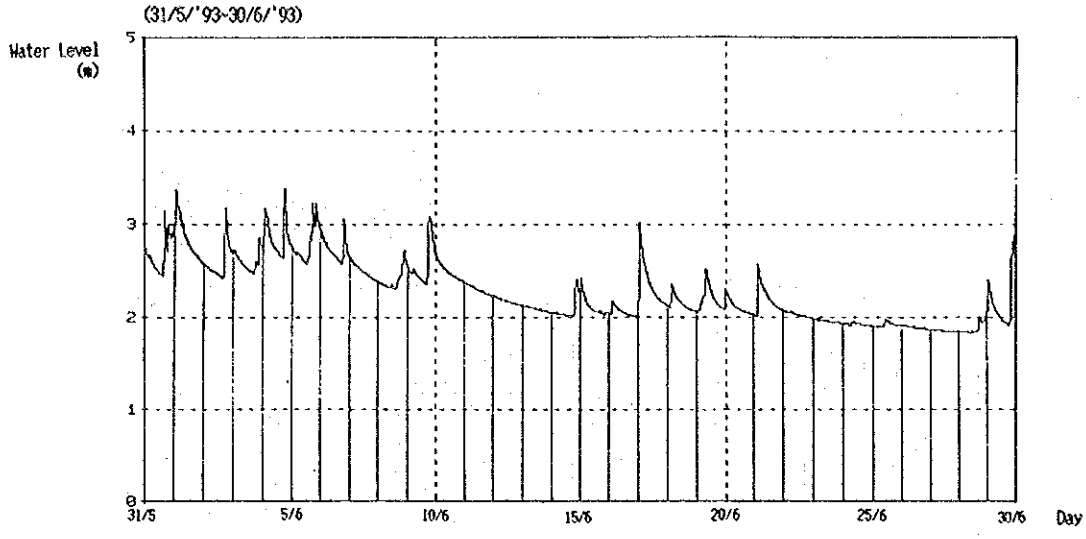
App.Figure-1 Transition of water level

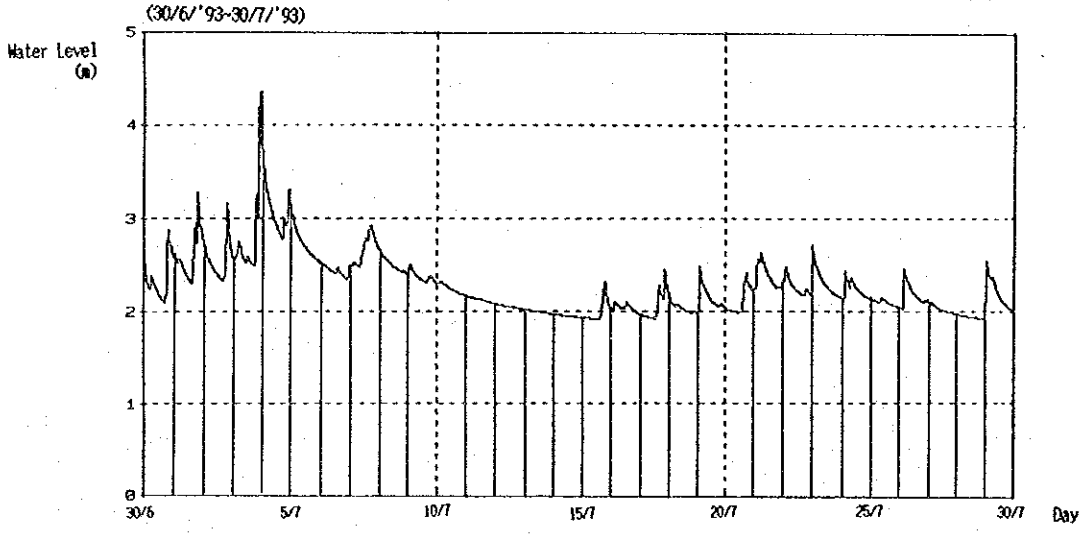


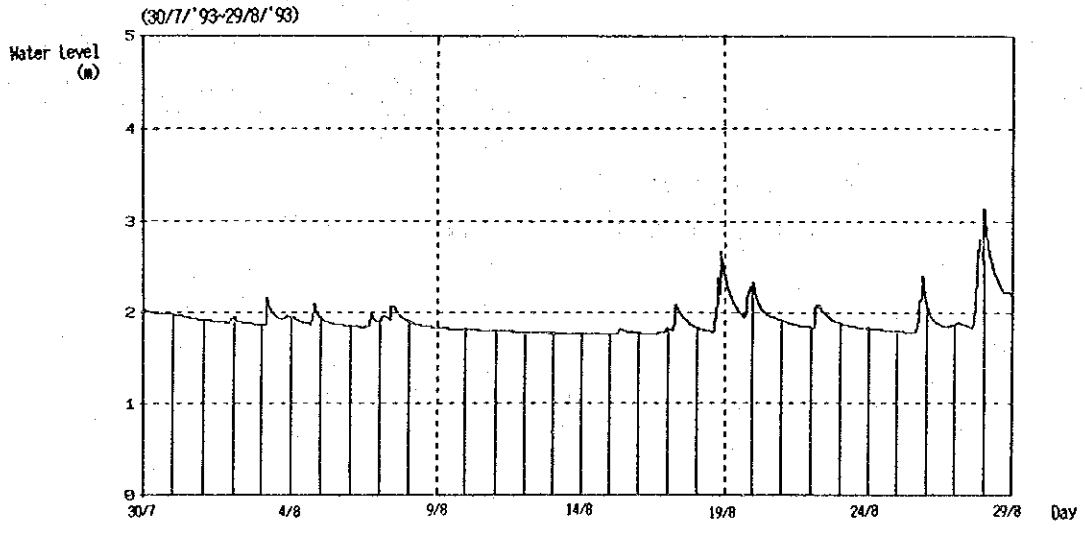
App.Figure-2 Transition of water level



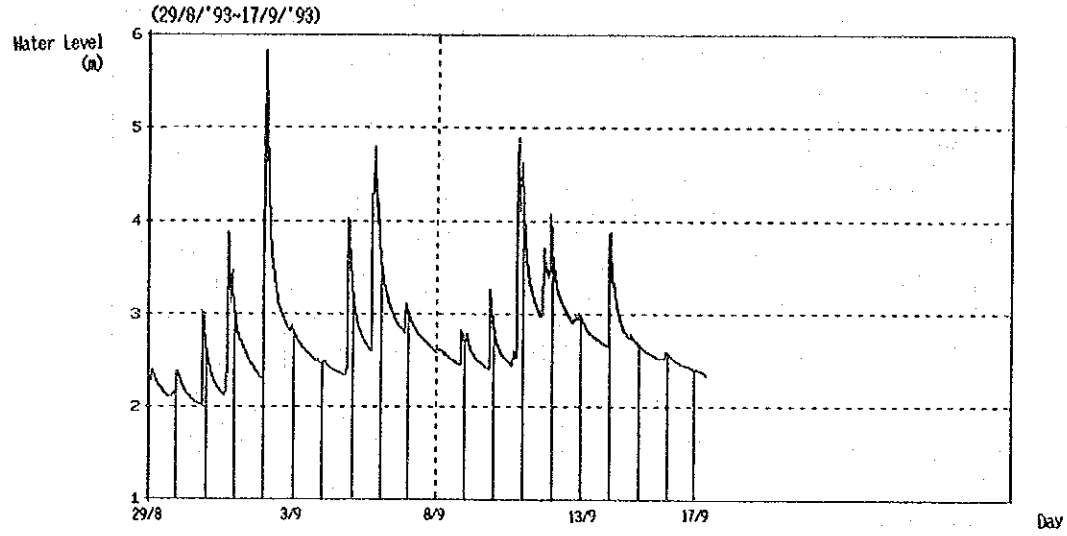
App.Figure-3 Transition of water level







App.Figure-4 Transition of water level



App.Figure-5 Transition of water level

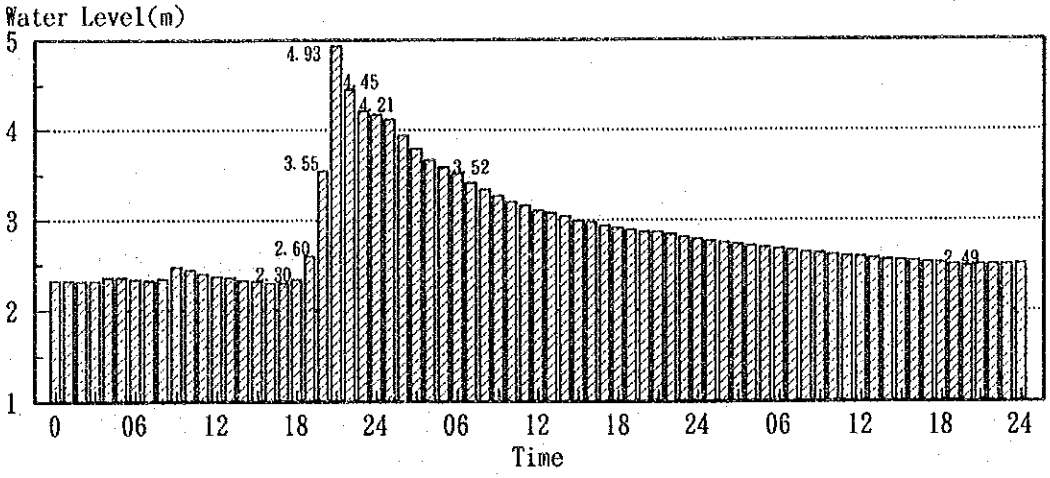
App.Table-16 Monthly water level Unit:m

Year	1992				1993									
Month	9	10	11	12	1	2	3	4	5	6	7	8	9	Total
Max.	2.98	4.68	4.93	4.53	3.89	3.55	3.24	4.37	4.69	3.33	4.30	3.88	5.84	5.84
Min.	1.72	2.03	2.05	1.98	1.77	1.75	1.84	2.00	2.12	1.84	1.92	1.76	2.30	1.72
Avg.	1.90	2.40	2.53	2.37	2.10	2.09	2.26	2.41	2.58	2.27	2.27	1.95	2.86	2.31
D_avg	1.87	2.38	2.45	2.31	2.05	2.06	2.21	2.34	2.50	2.23	2.24	1.92	2.72	2.25
N_avg	1.90	2.43	2.60	2.45	2.14	2.10	2.31	2.47	2.66	2.31	2.32	1.96	3.02	2.36

Note; Avg :Daily average

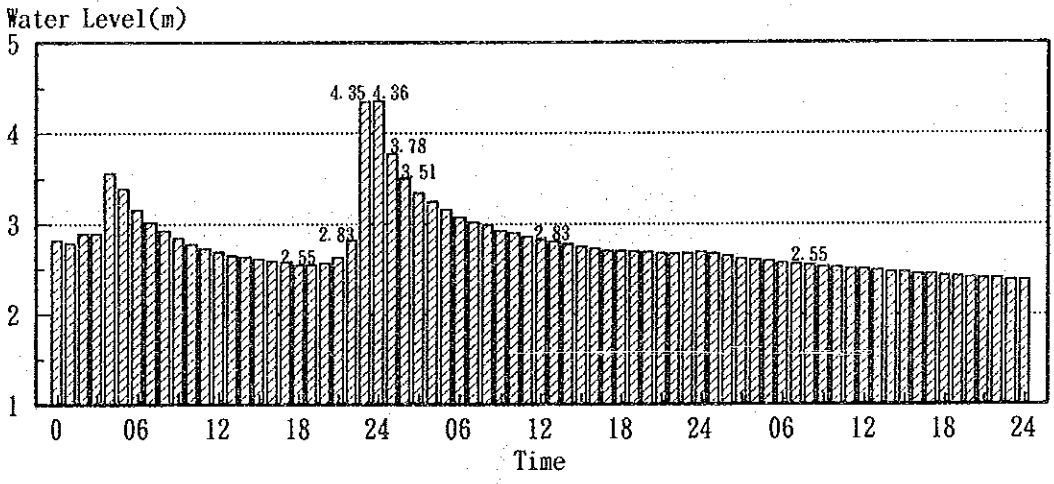
D_avg.:Average from 7:00 to 18:00

N_avg.:Average from 19:00(the day before) to 6:00



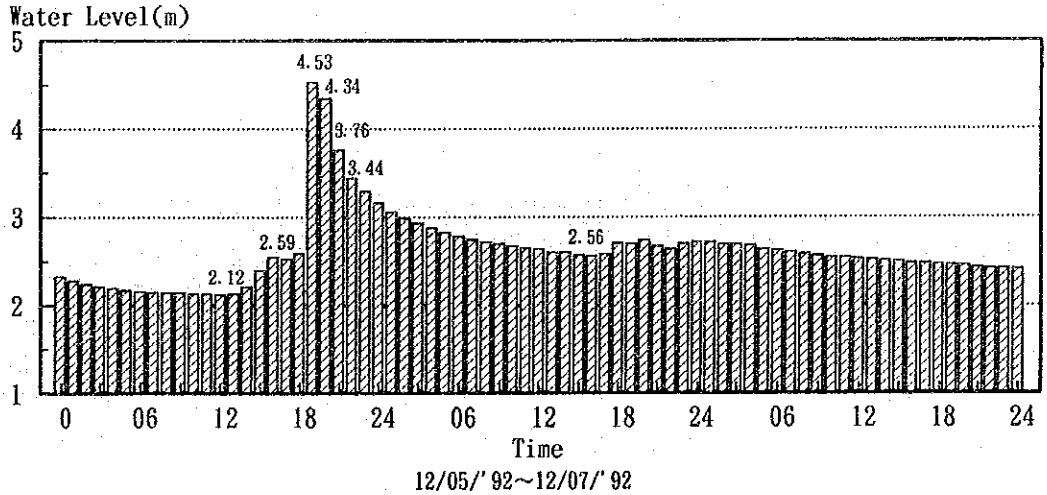
11/22/'92~11/24/'92

App.Figure-6 Stage-graph



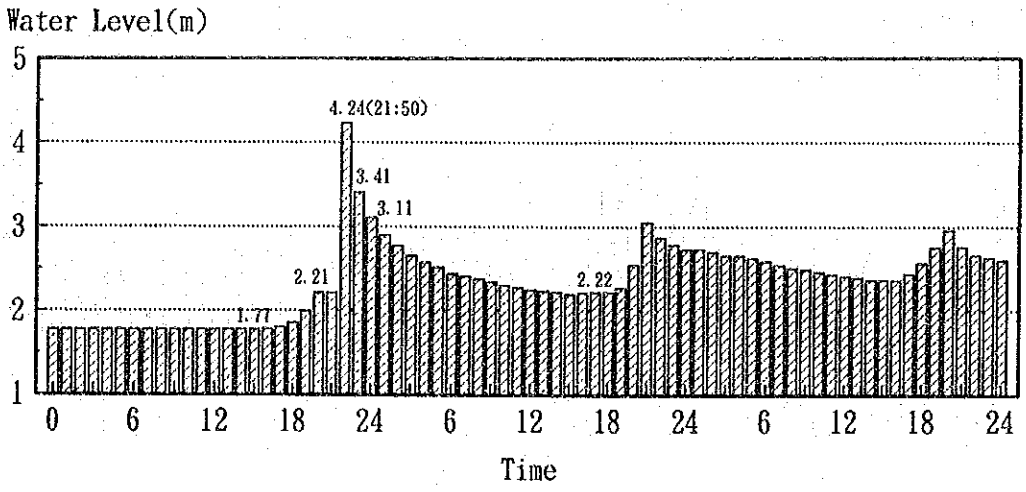
11/30/'92~12/02/'92

App.Figure-7 Stage-graph



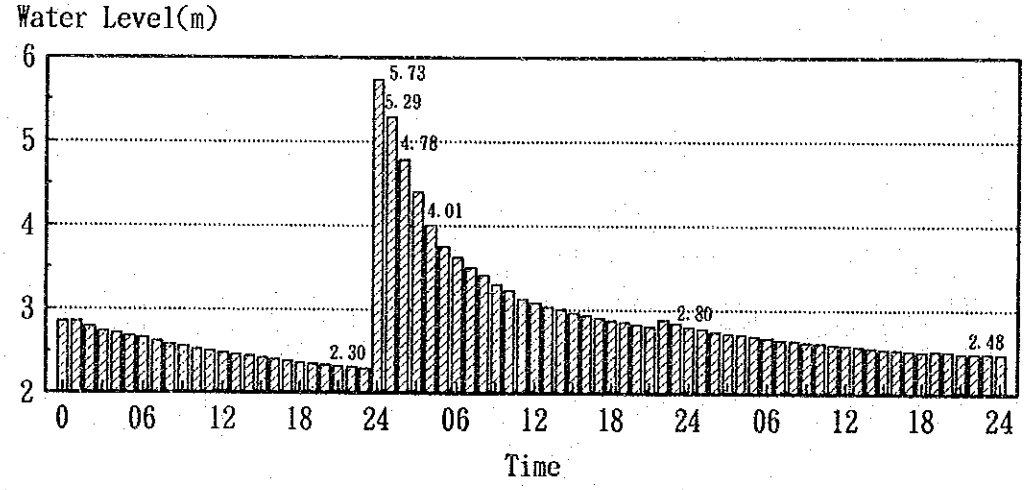
12/05/'92~12/07/'92

App.Figure-8 Stage-graph



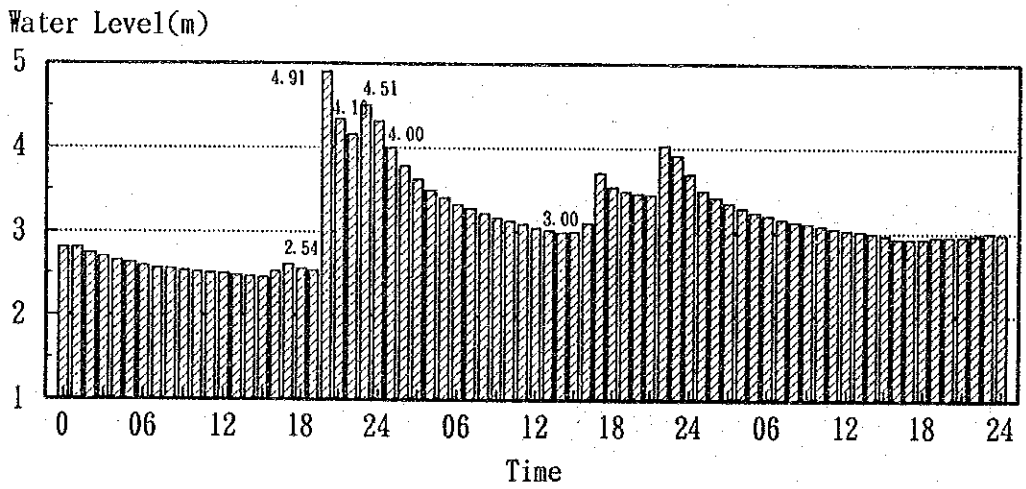
15/01/'93~17/01/'93

App.Figure-9 Stage-graph



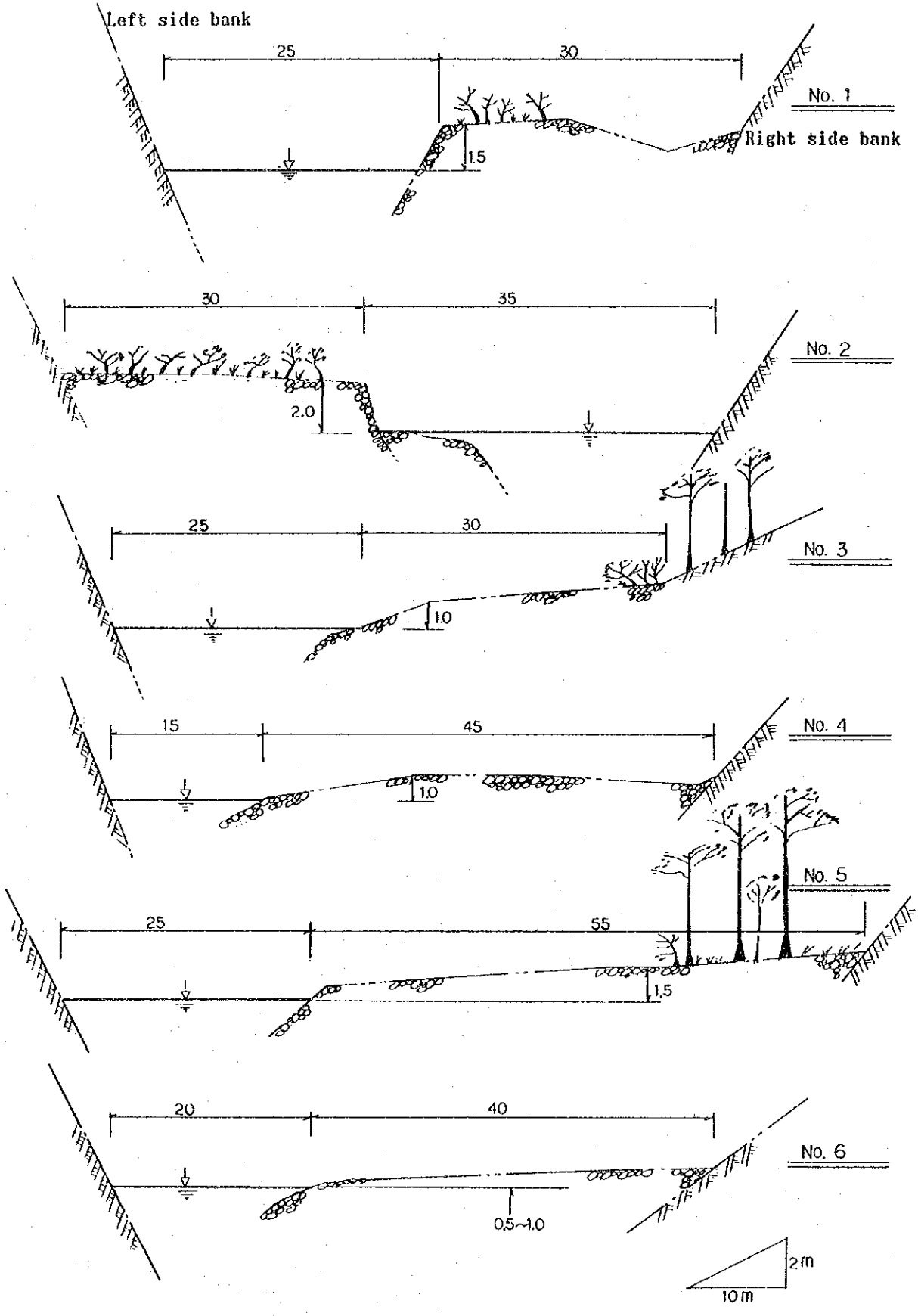
01/09/'93~03/09/'93

App.Figure-10 Stage-graph

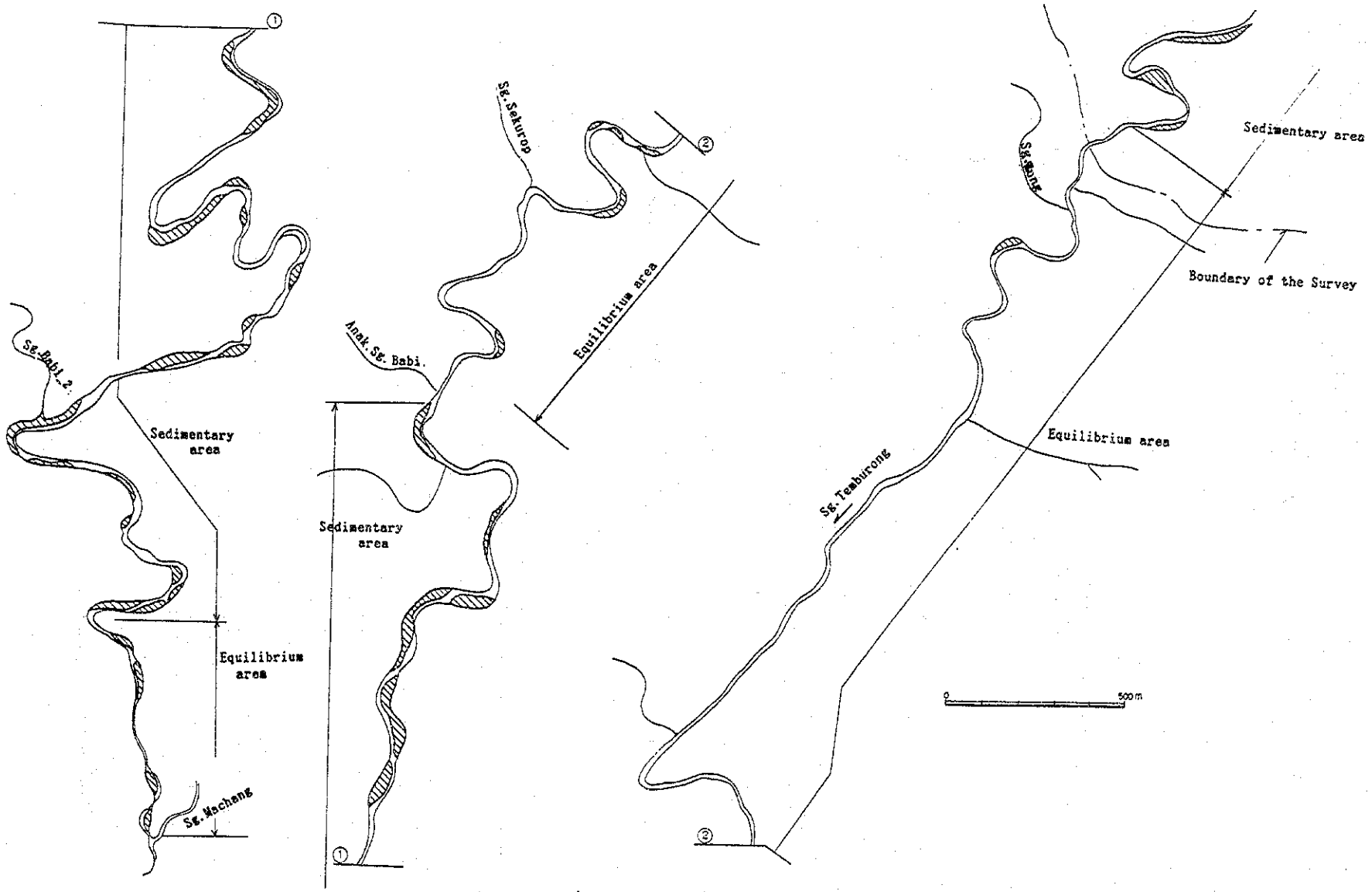


10/09/'93~12/09/'93

App.Figure-11 Stage-graph



App.Figure-12 Lateral profile sketch of sedimentation



App.Figure-13 Distribution of sedimentary area, upper stream from Sg.machang junction by aerial photograph interpretation

App.Table-17 Check list of mammals (1)

(1)

Species	英名	Record					Rare protected		
		V6N3	V4N3	LTB	GCSO	Inter-view	IUCN	CITE	Brunei
INSECTIVORA									
ECHINACEIDAE									
1. Echinosorex gymnurus	Moon rat	○				○			
2. Hylomys suillus	Lesser gymnure								
SORICIDAE									
3. Suncus murinus									
4. Suncus ater	House shrew								
5. Suncus etruscus	Black shrew								
6. Crocidura monticola	Sunda shrew								
7. Crocidura fuliginosa	South-east asian white-toothed shrew								
8. Chimarrogale himalayica	Himalayan water shrew								
SCANDENTIA									
TUPAIDAE									
1. Ptilocercus lowii	Pentail treeshrew								
2. Tupaia glis	Common treeshrew			○		○			
3. Tupaia splendidula	Ruddy treeshrew								
4. Tupaia montata	Mountain treeshrew								
5. Tupaia minor	Lesser treeshrew	○		○		○			
6. Tupaia glacilis	Slender treeshrew								
7. Tupaia picta	Painted treeshrew	○							
8. Tupaia dorsalis	Striped treeshrew								
9. Tupaia tana	Large treeshrew								
10. Dendrogale melanura	Smooth-tailed treeshrew								
DERMOPTERA									
CYNOCEPHALIDAE									
1. Cynocephalus variegatus	Flying lemur	○		○		○			
CHIROPTERA									
CYNOCEPHALIDAE									
1. Rousettus amplexicaudatus	Geoffroy's rousette	○							
2. Rousettus spinalatus	Bare-backed rousette								
3. Pteropus vampyrus	Large flying fox	○				○			
4. Pteropus hypomelanus	Island flying fox								
5. Cynopterus brachyotis	Short-nosed fruit bat	○		○					
6. Cynopterus sphinx	Greater short-nosed fruit bat								
7. Cynopterus horsfieldi	Horsfield's fruit bat								
8. Penthetor lucasi	Duskey fruit bat			○					
9. Magacrops ccaudatus	Tailless fruit bat	○		○					
10. Megacrops wetmorei	White collored fruit bat	○							
11. Dyacopterus spadiceus	Dayak fruits bat			○			K		
12. Chironax melanocephalus	Black capped fruit bat	○							
13. Balionycteris maculata	Spotted winged fruit bat	○		○					
14. Aethalops alecto	Grey fruit bat			○					
15. Eonycteris spelaea	Cave nectar bat								

App.Table-17 Check list of mammals (2)

Species	英名	Record					Rare protected		
		V6N3	V4N3	LTB	GCSO	Inter-view	IUCN	CITE	Brunei
16. Eonycteris major	Greater nectar bat								
17. Macroglossus minimus	Long tongued nectar bat	○							
18. Macroglossus logochilus	Long-tailed fruit bat			○					
EMBALLONURIDAE									
19. Taccolaimus saccolaimus	Pouched tomb bat	○							
20. Emballonura alecto	Greater sheath-tailed bat								
21. Emballonura monticola	Lesser sheath-tailed bat								
22. Taphozous saccolaimus	Pouched tomb bat								
23. Taphozous melanopogon	Blacd-bearded tomb bat								
24. Taphozous longimanus	Long-winged tomb bat								
MEGADERMATIDAE									
25. Megaderma spasma	Lesser false vampire								
NYCTERIDAE									
26. Nyceris javanica									
RHINOLOPHIDAE									
27. Rhinolophus borneensis	Borneo horseshoe bat			○					
28. Rhinolophus pusillus	Least horseshoe bat								
29. Rhinolophus arcuatus	Arcuate horseshoe bat								
30. Rhinolophus acuminatus	Acuminate horseshoe bat								
31. Rhinolophus affinis	Intermediate horseshoe bat								
32. Rhinolophus creaghi	Creagh's horseshoe bat								
33. Rhinolophus philippinensis	Philippine horseshoe bat								
34. Rhinolophus trifoliatus	Trefoil horseshoe bat	○							
35. Rhinolophus sedulus	Lesser woolly horseshoe bat			○					
36. Rhinolophus luctus	Great woolly horseshoe bat								
HIPPOSIDERIDAE									
37. Hipposideros ater	Dusky roundleaf bat								
38. Hipposideros bicolor	Bicalored roundleaf bat								
39. Hipposideros cineraceus	Ashy roundleaf bat								
40. Hipposideros dyacorum	Dayak roundleaf bat								
41. Hipposideros sabanus	Least roundleaf bat								
42. Hipposideros ridleyi	Ridley's Leaf-nosed bat						I		
43. Hipposideros cervinus	Fawn roundleaf bat								
44. Hipposideros galeritus	Cantor's roundleaf bat								
45. Hipposideros coxi	Cox's roundeaf bat								
46. Hipposideros larvatus	Intermediate roundleaf bat								
47. Hipposideros diadema	Diadem roundleaf bat	○		○					
48. Coelops robinsoni	Lesser tailless roundleaf bat								
VESPERTILIONIDAE									
VESPERTILIONINAE									
49. Myotis(Selysius)muricola	Whiskered myotis								
50. Myotis(Selysius)ater	Black myotis								
51. Myotis(Selysius)montivagus	Large brown myotis								
52. Myotis(Selysius)siligorensis	Small-toothed myotis								
53. Myotis(Selysius)ridleyi	Ridley's myotis								
54. Myotis(Leuconoe)horsfieldii	Horsfield's myotis								

App.Table-17 Check list of mammals (3)

(3)

Species	英名	Record					Rare protected		
		V6N3	V4N3	LTB	GCSO	Inter-view	IUCN	CITE	Brunei
55. Myotis(Leuconoe)hasseltii	Hasselt's large-footed myotis								
56. Myotis(Leuconoe)adversus	Grey large-footed myotis								
57. Myotis(Leuconoe)macrotarsus	Pallid large-footed myotis								
58. Pipistrellus javanicus	Javan pipistrelle								
59. Pipistrellus tenuis	Least pipistrelle								
60. Pipistrellus ceylonicus	Dark brown pipistrelle								
61. Pipistrellus kitcheneri	Red-brown pipistrelle								
62. Pipistrellus petersi	Woolly pipistrelle								
63. Pipistrellus cuprosus	Coppery pipistrelle								
64. Pipistrellus stenopterus	Narrow-winged pipistrelle								
65. Pipistrellus vordermanni	White-winged pipistrelle								
66. Glischropus tylopus	Thick-thumbed pipistrelle								
67. Philetor brachypterus	Narrow-winged brown bat								
68. Hesperoptenus doriae	False serotine								
69. Hesperoptenus blanfordi	Least false serotine								
70. Hesperoptenus tomesi	Tomes' false serotine								
71. Tylonycteris robustula	Greater bamboo bat	○				○			
72. Tylonycteris pachypus	Lesser bamboo bat	○				○			
73. Scotophilus kuhlii									
MURININAE									
74. Murina cyclotis	Orange tube nosed bat	○							
75. Murina aenea	Bronzed tube-nosed bat								
76. Murina rozendaali	Gilded tube-nosed bat								
77. Murina suilla	Lesser tybe-nosed bat								
78. Harpiocephalus harpia	Hairy-winged bat								
KERIVOULINAE									
79. Kerivoula cyclotis	Papillose bat			○					
80. Kerivoula hardwickii	Hardwicke's wooly bat								
81. Kerivoula pellucida	Clear-winged wooly bat								
82. Kerivoula intermedia	Small woolly bat								
83. Kerivoula minuta	Least woolly bat								
84. Kerivoula whiteheadi	Whitehead's woolly bat								
85. Phoniscus jagorii	Frosted grooved-toothed bat								
86. Phoniscus atrox	Gilded grooved-toothed bat								
MINIOPTERINAE									
87. Miniopterus magnater	Large bent-winged bat								
88. Miniopterus schreibersi	Common bent-winged bat								
89. Miniopterus pusillus	Small bent-winged bat								
90. Miniopterus medius	Medium bent-winged bat								
91. Miniopterus australis	Lesser bent-winged bat								
MOLOSSIDAE									
92. Cheiromeles torquatus	Naked bat	○							
93. Tadarida(Mops)mops	Free-tailed bat								
94. Tadarida(Chaerephon)plicata	Wrinkle-lipped bat								

App.Table-17 Check list of mammals (4)

(4)

Species	英名	Record					Rare protected		
		V6N3	V4N3	LTB	GCSO	Inter-view	IUCN	CITE	Brunei
PRIMATES									
LORISIDAE									
1. Nycticebus coucang	Slow loris	○			○	○			○
TARSIDAE									
2. Tarsius bancanus	Western tarsier	○				○			○
CERCOPITHECIDAE									
3. Presbytis melalophos	Banded langur					○			
4. Presbytis hosei	Grey leaf monkey			○		○			
5. Presbytis rubicunda	Red leaf monkey			○					
6. Presbytis frontata	White fronted leaf monkey		○			○			
7. Presbytis cristata	Silvered langur	○				○			
8. Nasalis larvatus	Proboscis monkey	○	○				V	I	○
9. Macaca fascicularis	Crab-eating or Long tailed macague		○	○		○			
10. Macaca nemestrina	Pig tailed monkey	○	○	○		○			
HYLOBATIDAE									
11. Hylobates muelleri	Bornean gibbon			○		○			
12. Hylobates agilis									
13. Hylobates molock	Sunda Island gibbon								
PONGIDAE									
14. Pongo pygmacus	Orang-utan						E	I	○
PHOLIDOTA									
MANIDAE									
1. Manis javanica	Pangolin	○				○		II	
RODENTIA									
SCIURIDAE									
SCIURINAE									
1. Ratufa affinis	Giant squirrel			○	○	○		II	
2. Callosciurus prevostii	Prevost's squirrel		○	○	○	○			
3. Callosciurus baluensis	Kinabalu squirrel								
4. Callosciurus notatus	Plantain squirrel	○		○		○			
5. Callosciurus adamsi	Earspot squirrel			○		○			
6. Callosciurus orestes	Bornean black-banded squirrel								
7. Sundasciurus hippurus	Horse tailed squirrel			○					
8. Sundasciurus lowii	Low's squirrel			○					
9. Sundasciurus tenuis	Slender squirrel	○		○					
10. Sundasciurus jentinki	Jentink's sqiorrel								
11. Sundasciurus brookei	Brooke's squirrel								
12. Glyphotes simus	Red-bellied sculptor squirrel								
13. Lariscus insignis	Three-striped ground squirrel								
14. Lariscus hosei	Four-striped ground squirrel								
15. Dremomys everetti	Bornean mountain ground squirrel								
16. Rhinosciurus laticaudatus	Shrew-faced ground squirrel								
17. Nannosciurus melanotis	Black-eared pigmy squirrel								
18. Exilisciurus exilis	Plain pigmy squirrel			○	○	○			

App.Table-17 Check list of mammals (5)

(5)

Species	英名	Record					Rare protected		
		V6N3	V4N3	LTB	GCSO	Inter-view	IUCN	CITE	Brunei
19. Exilisciurus exilis	Plain pigmy squirrel								
20. Rheithrosciurus macrotis	Giant tufted ground squirrel		○	○					
PETAURISTINAE									
21. Petaurillus hosei	Hose's pigmy flying squirrel	○				○			
22. Petaurillus emiliae	Lesser pigmy flying squirrel					○			
23. Iomys horsfieldi	Horsfield's flying squirrel	○	○						
24. Aeromys tephromelas	Black flying squirrel								
25. Aeromys thomasi	Thomas's flying sqiorrel								
26. Petinomys hageni	Hagen's flying squirrel								
27. Petinomys genibarbis	Whiskered flying squirrel	○							
28. Petinomys setosus	Temminck's flying squirrel	○							
29. Petinomys vordermanni	Vordermmann's flying squirrel	○				○			
30. Hylopetes lepidus	Grey-cheeked flying squirrel								
31. Hylopetes spadiceus	Red-cheeked flying squirrel								
32. Pteromyscus pulverulentus	Smoky flying squirrel								
33. Petaurista petaurista	Red giant flying squirrel		○	○	○				
34. Petaurista elegans	Spotted giant flying squirrel				○				
MURIDAE									
35. Rattus rattus	House rat	○							
36. Rattus tiomanicus	Malaysian field rat								
37. Rattus argentiventer	Ricefield rat								
38. Rattus baluensis	Summit rat								
39. Rattus exulans	Polynesian rat								
40. Rattus norvegicus	Norway rat								
41. Sundamys muelleri(Rattus m.)	Muller's rat			○					
42. Sundamys infraluteus	Mountain giant rat								
43. Niviventer cremoriventer	Dark-tailed tree rat								
44. Niviventer rapit	Long-tailed mountain rat								
45. Maxomys rajah(Rattus rajah)	Brown spiny rat	○		○					
46. Maxomys surifer(Rattus s.)	Red spiny rat			○					
47. Maxomys alticola	Mountain spiny rat								
48. Maxomys ochraceiventer	Chesnut-bellied spiny rat								
49. Maxomys baeodon	Small spiny rat								
50. Maxomys whiteheadi(Rattus w.)	Whitehead's rat			○					
51. Leopoldamys sabanus(Rattus sabanus)	Longtailed giant rat	○		○					
52. Lenothrix canus	Grey tree rat								
53. Mus castaneus	House mouse								
54. Mus caroli	Ricefield mouse								
55. Chiropodomys gliroides	Common pencil-tailed tree mouse								
56. Chiropodomys major	Large pencil-tailed tree mouse								
57. Chiropodomys muroides	Grey-bellied pencil-tailed tree mouse								
58. Haeromys margarettae	Ranee mouse								
HYSTRICIDAE									
59. Trichys fasciculata	Long-tailed porcupine								
60. Hystrix brachyura	Common porcupine	○		○		○			
61. Thecurus crassispinis	Thick spined porcupine			○		○			
62. Thichys lipula gunter	Long tailed porcupine	○				○			

App.Table-17 Check list of mammals (6)

(6)

Species	英名	Record					Rare protected		
		V6N3	V4N3	LTB	GCSO	Inter-view	IUCN	CITE	Brunei
CARNIVORA									
CANIDAE									
1. Canis familiaris (D)									
URSIDAE									
2. Helarctos malayanus	Sun bear	○		○		○		I	
MUSTELIDAE									
3. Maltes flavigula	Yellow-throated marten			○					
4. Mustela nudipes	Malay weasel				○				
5. Melogale personata	Ferret-badger								
6. Mydaus javanensis	Teledu								
7. Lutra sumatrana	Hairy-nosed otter	○				○	K	2	
8. Lutra lutra	Eurasian otter								
9. Lutra(Lutrogale)perspicillata	Smooth coated otter					○	K		
10. Aonyx(Amblonyx)cinerea	Small clawed otter	○				○	K		
VIVERRIDAE									
11. Viverra tangalunga	Malay civet(Tangalung)		○		○	○			
12. Prionodon linsang	Banded lingsang	○			○	○		II	
13. Paradoxurus hermaphroditus	Common palm civet	○			○				
14. Paguma larvata	Masked palm civet			○					
15. Arctictis binturong	Binturong	○				○			
16. Arctogalidia trivirgata	Java small-toothed palm civet				○		I		
17. Hemigalus derbyanus	Banded musang or palm civet	○	○	○				II	
18. Hemigalus hosei	Hose's civet								
19. Cynogale bennettii	Otter civet	○					K	II	
20. Herpestes brachyurus	Short tailed mongoose	○				○			
21. Herpestes hosei	Hose's mongoose								
22. Herpestes semitorquatus	Collared mongoose								
FELIDAE									
23. Neofelis nebulosa	Clouded leopard						V	I	○
24. Felis marmorata	Marbled cat					○	I	I	
25. Felis badia	Bornean bay cat						R	II	
26. Felis planiceps	Flat headed cat	○				○	I	I	
27. Felis bengalensis	Leopard cat	○				○		I	
28. Felis catus (D)									
PROBOSCIDEA									
ELEPHANTIDAE									
1. Elephas maximus	Asian elephant						E		
PERISSODACTYLA									
RHINOCEROTIDAE									
1. Dicerorhinus sumatrensis	Sumatran rhinoceros						E		○

App.Table-17 Check list of mammals (7)

(7)

Species	英名	Record					Rare protected		
		V6N3	V4N3	LTB	GCSO	Inter-view	IUCN	CITE	Brunei
ARTIODACTYLA									
SUIDAE									
1. Sus barbatus	Bearded pig		○	○		○	V		
2. Sus scrofa (D)									
TRAGULIDAE									
3. Tragulus javanicus	Lesser mouse deer			○		○			
4. Tragulus napu	Large mouse deer	○	○	○		○			
CERVIDAE									
5. Muntiacus muntjak	Barking deer		○	○		○			
6. Muntiacus atherodes									
7. Cervus unicolor	Sambar deer			○		○			
8. Cervus timorensis	Javan rusa								
BOVIDAE									
9. Bos javanicus	Banteng						V		
10. Bos indicus (D)									
11. Bubalus bubalis (D)									
12. Capra aegagrus (D)									

App.Table-18 Check list of birds (Temburong district), (1)

(1)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
PELECANIFORMES								
1. Anhinga melanogaster	Darter	○						
CICONIFORMES								
2. Butorides striatus	Little heron	○						
3. Ardea sumatrana	Duskey-grey heron		○	○				
FALCONIFORMES								
4. Spizaetus alboniger	Blyth's hawk eagle	○						
5. S.nanus	Wallace's hawk eagle							
6. S.cirrhatus	Changeable hawk-eagle	○						
7. Accipiter trivirgatus	Crested goshawk	○						
8. Hieraaetus kienerii	Rufous-belled eagle	○		○				
9. Ichthyophaga humilis	Lesser fish eagle	○		○				
10. I.ichthyaetus	Grey-headed fish eagle	○						○
11. Spilornis cheela	Crested serpent eagle	○						
12. S.sp.	Mountain serpent eagle	○						
13. Microhierax fringillarius	Black-thighed falconet	○						
GALLIFORMES								
14. Rollulus rouloul	Crested partridge	○	○			III		
15. Argusianus argus	Great argus	○		○		II		
16. Lophura erythrophthalma	Crestless fireback			○		III		
CHARADRIFORMES								
17. Actitis hypoleucos	Common sandpiper	○						
18. Calidris subminuta	Long-toed stint							
19. Phaloropus lobatus	Red-necked Phalarope	○		○				
COLUMBIFORMES								
20. Treron curvirostra	Thick-billed green pigeon	○						
21. T.olax	Little green pigeon							
22. T.fulvicollis	Cinnamon headed green pigeon			○				

App.Table-18 Check list of birds (Temburong district), (2)

(2)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
23. Ducula badia	Mountain imperial pigeon	○						
24. Chalcophaps indica	Emerald dove	○						
25. Ptilinopus jambu	Jambu fruit pigeon			○				
26. Psittinus cyanurus	Little cuckoo-dove	○		○				
27. Macropygia ruficeps				○				
PSITTACIFORMES	Blue-rumped parrot							
28. Loriculus galgulus	Blue-crowned hanging parrot	○						
29. Psittacula longicauda	Long-tailed parakeet	○						
CUCULIFORMES								
30. Cuculus vagans	Moustached hawk cuckoo	○						
31. C.fugax	Hodgson's hawk cuckoo	○		○				
32. C.micropterus	Indian cuckoo	○						
33. Cacomantis sonneratii	Banded bay cuckoo	○						
34. C.sepulcralis	Indonesian cuckoo							
35. C.merulinus	Plaintive cuckoo							
36. Chrysococcyx xanthorhynchus	Violet cuckoo	○						
37. C.minutillus	Little bronze cuckoo	○						
38. Surniculus lugubris	Drongo cuckoo	○						
39. Carpococcyx radiceus	Ground cuckoo		○		K			
40. Phaenicophaeus sumatranus	Chestnut-bellied malkoha			○				
41. P.chlorophaeus	Raffles's malkoha	○						
42. P.curvirostris	Chestunt-breasted malkoha	○						
43. P.javanicus	Red-billed malkoha	○						
44. P.diardii	Black-bellied malkoha							
45. Centropus rectunguis	Short-toed coucal							
46. C.sinensis	Greater coucal							
STRIGIFORMES								
47. Phodilus badius	Bay owl			○				
48. Glaucidium brodiei	Collared owlet			○				
49. Bubo sumatranus	Barred eagle owl	○						

App.Table-18 Check list of birds (Temburong district), (3)

(3)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
50. Ketupa ketupu	Buffy fish owl	○						
51. Strix leptogrammica	Brown wood owl	○						
52. Ninox scutulata	Brown hawk owl	○		○				
CAPRIMULGIFORMES								
53. Batrachostomus javensis	Javan frogmouth							
54. B.auritus	Large frogmouth			○				
55. B.stellatus	Gould's frogmouth	○		○				
56. Grey nightjar	Grey nightjar	○						
57. Eurostopus temminckii	Malaysian eared nightjar	○		○				
APODIFORMES								
58. Aerodramus spp	Cave swiftlets	○						
59. Collocalia esculenta	White-bellied swiftlet	○						
60. Hirundapus giganteus	Brown needletail							
61. H.caudacutus	White-throated needletail	○						
62. Rhaphidura leucopygialis	Silver-rumped spinetail	○						
63. Hemiprocne comata	Whiskered tree-swift	○						
64. H.longipennis	Grey-rumped tree-swift	○						
65. Collocalia maxima	Black-nest swiftlet	○						
66. C.fuciphage	Grey-rumped(Edible-nest)swiftlet	○		○				
67. Cypsiurus batasiensis	Asian palm swift	○		○				
68. Apus pacificus	Fork-tailed swift			○				
TROGONIFORMES								
69. Harpactes Kasumba	Red-naped trogon	○		○				
70. H.diardii	Diard's trogon	○		○				
71. H.duvaucelii	Scarlet-rumped trogon	○		○				
72. H.orrophaeus	Cinnamon-rumped trogon	○		○				
CORACIIFORMES								
73. Lacedo pulchella	Banded Kingfisher	○		○				
74. Halcyon capensis	Stork-billed kingfisher							

App.Table-18 Check list of birds (Temburong district), (4)

(4)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
75. Halcyon concreta	Chestnut-collared Kingfisher	○		○				
76. Alced meninting	Blue-eared kingfisher	○						
77. A.euryzona	Blue-banded kingfisher			○				
78. Ceyx rufidorsus	Rufous-backed kingfisher							
79. Nyctyornis amictus	Red-bearded bee-eater	○						
80. Berenicornis comatus	White-crowned(white-crested)hornbill	○		○				○
81. Anthracoceros malayanus	Black hornbill	○						○
82. Anorrhinus galeritus	Bushy crested hornbill	○						○
83. Rhyticeros undulatus	Wreathed hornbill	○		○				○
84. R.corrugatus	Wrinkled hornbill	○						○
85. Buceros rhinoceros	Rhinoceros hornbill	○				II		○
86. Rinoplax vigil	Helmeted hornbill	○		○	I	I		○
87. Anthracoceros coronatus	Pied hornbill			○				○
PICIFORMES								
88. Calorhamphus fuliginosus	Brown barbet	○						
89. Megalaima chrysopogon	Gold-whiskered barbet	○						
90. M.mystacophanos	Red-throated barbet	○						
91. M.henrici	Yellow-crowned barbet	○						
92. M.australis	Bule-eared barbet	○						
93. Indicator archipelagicus	Malaysian honeyguide			○				
94. Sasia abnormis	Rufous piculet							
95. Picus mentalis	Checker-throated woodpecker	○		○				
96. P.puniceus	Crimson-winged woodpecker	○						
97. P. miniaceus	Banded woodpecker	○						
98. Picoides canicapillus	Grey-capped woodpecker	○						
99. Hemicircus concretus	Grey-and-buff woodpecker	○						
100. Celeus brachyurus(Micropternus.b)	Rufous woodpecker							
101. Dinopium rafflesii	Olive-backed woodpecker							
102. Meiglyptes tukki	Buff-necked woodpecker							
103. M.tristis	Buff-rumped woodpecker	○						
104. Blythipicus rubiginosus	Maroon woodpecker	○						
105. Dryocopus javensis	White-bellied woodpecker	○						
106. Muelleripicus pulverulentus	Great slaty woodpecker	○						

App.Table-18 Check list of birds (Temburong district), (5)

(5)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
107. Reinwardtipicus validus (chrysocolaptes.v)	Orange-backed woodpecker	○		○				
PASSERIFIFORMES								
108. Calyptomena viridis	Green broadbill	○		○				
109. Cymbirhynchus macrorhynchos	Black-&-red broadbill	○						
110. Eurylaimus ochomalus	Black-&-yellow broadbill	○						
111. E.javanicus	Banded broadbill	○		○				
112. Corydon sumatranus	Dusky broadbill	○		○				
113. Pitta granatina	Garnet pitta	○						
114. P.guajana	Banded pitta	○	○			II		
115. P.baudi	Blue-headed pitta	○			K			
116. Hirundo rustica	Barn swallow	○						
117. H.daurica	Red-rumped swallow	○						
118. Motacilla cinerea	Grey wagtail	○						
119. Coracina fimbriata	Lesser cuckoo-shrike	○						
120. C.striata	Bar-bellied Cuckoo-shrike	○		○				
121. Hemipus hirundinaceus	Bar-winged flycatcher-shrike			○				
122. Pericrocotus flammeus/igneus	Minivet sp.							
123.Tephrodornis virgatus	Large woodshrike	○		○				
124. Aegithina viridissima	Green iora	○						
125. Chloropsis cyanopogon	Lesser green leafbird	○						
126. C.sonneratii	Greater green leafbird	○						
127. C.cochinchinensis	Blue-winged leafbird	○		○				
128. Irena puella	Fairy bluebird	○						
129. Pycnonotus cyaniventris	Grey-bellied bulbul	○	○					
130. P.squamatus	Scaly-breasted bulbul			○				
131. P.atriceps	Black-headed bulbul	○						
132. P.melanoleucos	Black-&-White bulbul	○						
134. P.brunneus	Red-eyed bulbul	○						
135. P.erythrophthalmos	Spectacled bulbul	○						

App.Table-18 Check list of birds (Temburong district), (6)

(6)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
136. Pycnonotus simplex	Cream-vented bulbul	○						
137. P.eutilotus	Puff-backed bulbul	○						
138. P.zeylanicus	Straw-headed bulbul			○				
139. Setornis criniger	Hook-billed bulbul			○				
140. Criniger bres	Grey-cheeked bulbul	○		○				
141. C.ochraceus	Ochraceous bulbul	○						
142. C.phaeocephalus	Yellow-bellied bulbul	○		○				
143. C.finschii	Finsch's bulbul	○						
144. Hypsipetes criniger	Hairy backed bulbul	○						
145. H.malaccensis	Streaked bulbul	○						
146. H.charlottae	Buff-vented bulbul	○		○				
147. Erithacus cyane	Siberian blue robin	○						
148. Copsychus pyrropyga	Rufous-tailed shama	○		○				
149. C.malabaricus	White-rumped shama	○						
150. Enicurus ruficapillus	Chestnut-naped forktail	○		○				
151. E.leschenaultii	White-crowned forktail	○		○				
152. Zoothera interpres	Chestnut-capped thrush	○		○				
153. Saxicola caprata	Pied chat			○				
154. Pellorneum capistratum	Black-capped babbler	○						
155. Trichastoma malaccense	Short-tailed babbler(Abbott's babbler)	○		○				
156. T.rostratum	White-chested babbler	○						
157. T.bicolor	Ferruginous babbler			○				
158. T.sepiarium	Horsfield's babbler	○		○				
159. Malacopteron magnum	Rufous-crowned babbler	○		○				
160. M.cinereum	Scaly crowned babbler	○		○				
161. M.magnirostre	Moustached babbler	○		○				
162. M.affine	Sooty capped babbler(Plain babbler)	○		○				
163. M.albogulare	White-throated babbler	○						
164. Pomatorhinus montanus	Chestnut-backed scimitar b.	○		○				
165. Ptilocichla Leucogrammica	Bornean wren-babbler	○		○	K			
166. Napothera atrigularis	Black-throated wren-babbler	○		○				
167. Stachyris nigriceps	Grey-throated babbler			○				
168. Kenopia striata	Striped wren babbler	○						

App.Table-18 Check list of birds (Temburong district), (7)

(7)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
169. Macronous ptilosus	Fluffy backed tit babbler	○						
170. Stachyris nigricollis	Black-throated babbler							
171. S.maculate	Chestnut-rumped babbler	○		○				
172. S.erythroptera	Chestnut-winged babbler	○						
173. S.leucotis	White-winged babbler	○						
174. S.poliocephala	Grey-headed babbler			○				
175. S.rufifrons	Rufous-fronted babbler	○						
176. Alcippe brunneicauda	Brown fulvetta	○		○				
177. Yuhina zantholeuca	White-bellied yuhina	○		○				
178. Garrulax mitratus	Chestnut-capped laughing thrush			○				
179. G.palliatus	Grey-&-brown laughing thrush			○				
180. G.sulphurea	Flyeater	○		○				
181. Phylloscopus borealis	Arctic warbler	○						
182. Prinia flaviventris	Yellow-vented prinia							
183. Orthotoms sericeus	Rufous-tailed tailorbird	○						
184. O.ruficeps	Ashy tailorbird	○						
185. O.atrogularis	Dark-necked tailorbird	○						
186. Rhipidura perlata	Spotted fantail	○		○				
187. Culicicapa ceylonensis	Grey-headed flycatcher	○		○				
188. Muscicapa sibirica	Scooty flycatcher	○						
189. M.latirostris	Asian brown flycatcher	○						
190. Eumyias(Muscicapa)thalassina	Verditer flycatcher			○				
191. Cyoris(Muscicapa)concreta	White-tailed flycatcher	○		○				
192. C.caerulate	Large-billed blue flycatcher	○		○				
193. C.superba	Bornean blue flycatcher		○	○				
194. C.turcosa	Malaysian blue flycatcher	○		○				
195. C.unicolor	Pale blue flycatcher	○						
196. Fidecura narcissina	Narcissus flycatcher	○						
197. F.dumetoria	Rufous-chested flycatcher			○				
198. Rhinomyias umbratilis	Grey-chested(White-throated) jungle flycatcher	○		○				
199. R.ruficauda	Rufous-tailed jungle flycatcher	○						
200. R.olivacea	Fulvous-chested jungle flycatcher			○				

App.Table-18 Check list of birds (Temburong district), (8)

(8)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
201. Philentoma pyrrhopterum	Rufous-winged monarch	○		○				
202. P.velatum	Maroon-breasted monarch	○						
203. Hypothymis azurea	Black-naped monarch	○						
204. Terpsiphone paradisi	Asian paradise-flaycatcher	○		○				
205. Sitta frontalis	Velvet-fronted nuthatch	○						
206. Prionoch.xanthopygius	Yellow-rumped flowerpecker	○						
207. P.percussus	Crimson-breasted flowerpecker							
208. P.maculatus	Yellow-breasted flowerpecker			○				
209. Dicaeum chrysorrheum	Yellow-vented flowerpecker	○						
210. D.everetti	Brown-backed flowerpecker				K			
211. D.trogonostigma	Orange-bellied flowerpecker							
212. D.concolor	Plain flowerpecker	○						
213. Anthreptes simplex	Plain sunbird	○		○				
214. A.rhodolaema	Red-throated sunbird							
215. A.singalensis	Ruby-cheeked sunbird			○				
216. Aethopyga mystacalis	Scarlet sunbird	○		○				
217. A.siparaja	Crimson sunbird							
218. Hypogramma hypogrammicum	Purple-naped sunbird	○		○				
219. Arachnothera longirostra	Little spiderhunter	○						
220. A.crassirostris	Thick-billed spiderhunter	○						
221. A.robusta	Long-billed spiderhunter	○		○				
222. A.chrysogenys	Yellow-eared spiderhunter	○		○				
223. A.flavigaster	Spectacled spiderhunter	○						
224. A.affinis	Grey-breasted spiderhunter	○		○				
225. Zosterops everetti	Everett's white-eye	○						
226. Pityriasis gymnocephala	Bornean bristlehead	○						
227. Lonchura fuscans	Dusky munia(White bellied munia)		○					
228. Aplonis panayensis	Philippine glossy starling							
229. Gracula religiosa	Hill myna							
230. Erythrura prasina	Long-tailed munia	○		○				
231. Dicrurus annectans	Crow-billed drongo	○						
232. D.paradiseus	Greater racket-tailed drongo	○						
233. D.hottentotus	Spangled drongo	○		○				

App.Table-18 Check list of birds (Temburong district), (9)

(9)

Species	English name	Record			Rare/Protected			
		LBUT	V6N4	V6N3	IUCN	CITE		Brunei
234. Dicrurus aeneus	Bronzed drongo	○		○				
235. Oriolus xanthonotus	Dark-throated oriole	○		○				
236. Platysmurus leucopterus	Black magpie	○		○				
237. Platylophus galericulatus	Crested jay	○		○				
238. Corvus enca	Slender-billed crow							
239. Dendrocitta occipitalis	Malaysian treepie			○				

The list of confirmed and rare species of mammals of Borneo in Brunei Darussalam (by J. Payne and C. M. Francis 1985), as well as the list of birds, were compiled based on the following literature:

a. Sources for confirmed mammal species

(1) The Brunei Museum Journal Vol. 6 Num. 3 1987---- V6N3
(2) " " " " Vol. 4 Num. 3 1979---- V4N3
(3) Research and Management of the Batu Apoi Forest Reserve, Temburong, Brunei, The University Brunei Darussalam/Royal Geographical Society Rainforest Project 1991/92 ---------- GCSO
(4) Red List of Threatened Animals ---------- IUCN
(5) List of Mammal Species Recorded at Ulu Temburong and Ulu Belait, Brunei Forest Resources and Strategic Planning Study ---------- LTB
(6) Animals of Tropical Rain Forests, Shigeki Yasuma 1991

b. Sources for confirmed bird species

An original list was prepared based on the information mentioned in (3) and was added and modified using the following information:

(1) Brunei Forest Resources and Strategic Planning Study: List of Bird Species Recorded at Ulu Temburong and Ulu Belait ---------- LBUT
(2) The Brunei Museum Journal Vol. 6 Num. 4 1988: Bird Report for Brunei Darussalam, by Clive F. Mann--- V6N4
(3) The Brunei Museum Journal Vol. 6 Num. 3 1987: A checklist of the birds of Brunei Darussalam, by C. F. M. ---------- V6N3

c. Legends

◎ Recorded for Temburong and high reliability confirmed by interviews.
○ Mammals: Recorded for Brunei Darussalam. Confirmed by interviews.
○ Birds: Recorded for Temburong.

IUCN: E (Endangered)
V (Vulnerable)
R (Rare)
I (Indeterminate)
K (Insufficiently known)

CITES: I (Species prohibited for commercial transactions)
II (Commercial transactions require permits of exporting countries)