Progress Report No. 2 (cont'd) 219 2



## 1. Introduction

According to literature, previous surveys and local information, the Gunung Leuser reserve and its peripheries are considered to be the most important area left in the rapidly shrinking range of the Sumatran rhinoceros.

This report is based on findings of a seven months' expedition in the Aceh province, especially the Gunung Leuser reserve where thoroughly surveyed was not only the easy accessible endangered peripheries but also penetrated the central area which even to natives was completely unknown, and where man has never been before.

## 2. Expeditions (see fig. 1)

To get acquainted with the work in the forest, several day-trips were made in the Alas valley, visiting three of the rhino areas listed by KURT (1970).

Expedition to Gunung Pawang Hussein (near to Mamas). In 1970, KURT found fresh rhino tracks in this area. I spent 10 days in the forest, walking about 60 km (see progress report No. 1).

Expedition to Mara Kompas, Jambur Serakut and Mara Bengkong. A ten days trip was made downstreams the Lawe Alas to the junction of Alas and Bengkong rivers. One-day trips were made from Mara Kompas and Jambur Serakut, whereas the lower Bengkong area was surveyed for three days (see progress report no. 1).

Expedition to the West coast and the Kluet reserve. As the road from Medan to Banda Aceh was closed, I flew to Banda Aceh and drove down the coast to Bakongan collecting information about rhinos and elephants. Two trips with a motor boat and local perahus (boats) were made in the Kluet reserve, where, according to Mr Poniran (Kepala Seksi PPA, Aceh) rhino tracks were reported by local rangers about two years ago.

Expedition to my study area in the south-west part of the Mamas catchment basin. This was the only occasion when I stayed longer in a rhino area to collect some ecological data. I spent 28 days in the forest and covered about 150 km by foot.

Helicopter expedition to upper Kluet and Mamas rivers. With a crew of five people I was flown into a natural helicopter landing place in the Kluet catchment area near the western boundaries of the reserve. For two days I followed the Kluet river in its southern direction and cut through to the Mamas river system, following the Mamas eastwards until it joins the Alas river. This expedition proved to be the most difficult one. This was partly due to the cargo restriction of the helicopter. The Mamas area is incredibly steep and we had to use the rope several times. As the Mamas had high water, we had to build about ten bridges. The rotan jungle was very dense and despite the fact that we walked ten hours a day, we sometimes only covered one kilometer. Because of these difficulties we ran out of rice and for the last two and a half days we had to feed on leaves and banana stems. On this expedition I spent 14 days in the jungle.

Expedition to Agusan and the Gunung Kemiri. The aim of this trip was to survey the northern part of the Gunung Leuser area, especially the northern part of the rift valley which is crossing about two thirds of the reserve. I climbed one of the mountains of the Kemiri group with an altitude of 2600 m. This Expedition took about 12 days and we walked about 70 km.

Expedition to the Bengkong, Kro, Karo and Kompas rivers. From Jambur Serakut I walked up the whole Bengkong river to Air Kro, about one day-trip from the westcoast. From the Bengkong I followed the Karo river to the north, cut through to the Kompas river catchment area, and followed the Kompas river back to Lawe Alas. Within 18 days I travelled about 50 km by perahu and about 130 km by foot.

Altogether, I spent 126 days in the forest, walked about 600 km and climbed 16'000 m approximately. A total of 300 km were covered by perahu, about 2000 km by car, 1200 km by aircraft and 60 km by helicopter. On most of the expeditions I was accompanied by Pawang Husin of the Dinas PPA, Rayon Kotacane.

## 3. Methods

The rhino areas can (fortunately!) only be reached by foot or by helicopter. Maps of this huge forest areas do not exist. On the map of VAN HEURN (1:400'000), mountains and rivers inside the reserve were mapped mostly according the author's imagination. Local hunters know some of the peripheral areas but some 60% of the Gunung Leuser reserve is completely unknown territory. For some of my expeditions, I luckily could use a "45°-side-looking" radar map of Newmont Limited. This map gives at least an idea about the relief of the mountains, but no data about their altitude and steepness. In the peripheral areas, I could use local guides, but for most of the time, my compass and the riverbeds were the only means of orientation.

Most of the Gunung Leuser area is incredibly steep and partly covered with dense rotan jungle which makes walking very difficult. Therefore, when ever possible, I followed riverbeds.

Visibility in the tropical rain forest is 20 m approximately. The flight distance of most animals is much larger, and observations of big game are therefore very rare. For the survey I thus had to rely on all kinds of tracks.

To estimate the population, I consider it of high importance to analyse footprints and faeces. As the hindfoot of a rhino is overlapping the forefoot, only the hindfoot was measured. Measurements were only taken if several footprints of a track were clearly visible. The following measurements were taken: maximum width, width of all three nails and if possible, distance between the nails. Of most tracks, a clearly visible footprint could be photographed in a standard method.

## 4.1 General remarks

The Gunung Leuser reserve sensu stricto is situated in the province of Aceh between 3 and 4 degrees north and 97 and 98 degrees east. It covers an area of 416'500 ha and is approximately 150 km long and 50 km wide.

The Bukit Barisan, the big mountain ridge of Sumatra is crossing the reserve from north to south. In the north and west, the ridge is rising to an altitude of over 3000 m level; in the east, it is descending to the Alas valley, and in the south to the lowlands of the Singkil area. The following habitats are included in the reserve:

- Primary Freshwater Swamp Forest - characterized by standing fresh water or moist ground and complex tangled root systems
- Primary Lowland Forest - under 500 m elevation with no standing water
- Primary Hill Forest - between 500 and 1000 m elevation
- Primary Submontane Forest - 1000 and 1600 m elevation
- Damp Moss Forest - over 1600 m elevation
- Treeless "blangs" of G. Leuser and G. Kemiri (Wilson and Wilson 1970)

Man-made secondary vegetation can only be found in the peripheries of the reserve (for more detailed information and history, see KURT 1970, VAN STEENIS 1938 et al.).

The favourite habitat for most larger mammals is going up to an altitude of about 1500 m level. Former surveys showed that these

areas only exist at the western and southern boundaries of the reserve. The Gunung Leuser reserve seemd therefore not to be a suitable area for preserving a large mammal fauna (KURT 1970).
According to the helicopter survey carried out by geologists of PT Aceh Mineral, and to my own findings, a huge rift valley is transversing the center of the reserve from north to south. Over a great distance, the bottom of this newly discovered rift valley is not ascending to an altitude of more than 1500 m. Therefore a rich mammal fauna can be found not only in the peripheries of the Gunung Leuser reserve, but also in its center which until now was considered to consist only of high mountains.

4.2 The central rift valley

With increasing human pressure at the peripheries, the central rift valley will gain importance, especially regarding the conservation of the Sumatran rhino. I therefore decided to penetrate as often as possible into this central rift valley during my survey.
The valley is about 100 km long. From north to south, the following rivers are passing it: an unnamed sideriver of the Lawe Alas which joins the Alas river near Agusan, a small part of the upper Ketambe river, most of the Mamas river, the Silukluk river and the lower Kompas river (see fig. 2).

4.2.1 The northern sideriver of the Alas

- Altitude: The catchment area of this river is situated in an altitude of about 2000 m. The river flows northwards and meets the Alas river at an altitude of 1200 m north of Agusan.
- Morphological features: In its upper part the valley is relatively flat and broad, whereas near the Alas river, it is narrowing to a gorge which is nearly impossible to penetrate.
- Vegetation: In the lower part, primary submontane forest, in the higher part damp moss forest and along the river, natural secondary growth is found.
- Fauna: During my survey, I found evidence of the following animals: Rusa (Cervus unicolor) abundant, direct observation of two adult females and one fawn, many trails and tracks; Serow (Capricornis sumatraensis) abundant, direct observation of two adult animals, tracks; Elephant (Elephas maximus) not abundant, elephant trails on the mountain ridges but analysis of the footprints and faeces show that the area is only visited occasionally by solitary animals (about every 3 months), no evidence of herds; Primates: Siamang (Symphalangus syndactylus) and leaf monkey (Presbytis aigula) abundant (direct observation), no evidence of Orangutan (Pongo pygmaeus).

No evidence was found of the rhino which seems to have never occurred in this area for at least five years. There is no human disturbance in this valley.

4.2.2 The upper Ketambe river

Only a short part of the left upper Ketambe flows in the rift valley from south to north. I did not visit this area. According to Pawang Husin who followed the expedition of the Dutch botanist de Wilde,

There are no signs of rhinos in the middle Ketambe area.

4.2.3 The upper Kluet river

- Altitude: In the catchment area of the upper Kluet river, the rift valley reaches its highest altitude with about 2200m. From this point, the Kluet river is flowing southward for about 12 km and is bending westward at an altitude of 1800 m, leaving the rift valley.
- Morphological features: The Kluet part of the rift valley is narrow but relatively flat.
- Vegetation: Damp moss forest with secondary growth along the riverbed.
- Fauna: Elephant (Elephas maximus) not abundant, trails, footprints and faeces of solitary animals which occasionally seem to visit the area. Rhino not abundant, only a few old wallows and footprints have been found.
There is no human disturbance in this area.

4.2.4 The Mamas river

- Altitude: A low ridge with an altitude of 1900 m is separating the upper Kluet from a Mamas sideriver. This Mamas sideriver which is flowing in the continuation of the rift valley, is directing south-east and reaching the Mamas main river at an altitude of 950 m.
- Morphological features: The upper Mamas and its siderivers are forming a huge basin with a diameter of more than 20 km. The Mamas main river flows into a broad and flat valley until it leaves the rift valley in an incredible gorge.
- Vegetation: In the valley slopes, primary submontane forest and in the higher parts damp moss forest is found. Natural secondary growth has been observed along the rivers and on eroded mountain slopes.
- Fauna: Concerning wildlife, this part of the rift valley is the most important one. With increasing human pressure at the boundaries of the Gunung Leuser reserve, it might likely become the most important area of the reserve. Rhino: abundant! Trails, footprints wallows, feeding tracks and faeces can be found all over the area. Rusa (Cervus unicolor): tracks; barking dear (Muntiacus muntjak): direct observation, tracks, faeces; serow (Capricornis sumatraensis): tracks, faeces; wild boar (Sus scrofa): direct observation, nests, footprints.
Rusa, barking dear, serow and wild boar are also abundant. Elephant (Elephas maximus): a net of elephant trails is covering the area. According to the analysis of tracks and faeces, only solitary animals live in this region. I found no evidence of herds. Orang utan (Pongo pygmaeus): abundant. I could observe two females. Several times, the long range call of males was heard. Nests could be observed frequently. Other primates: Siamang (Symphalangus syndactylus) and leaf monkeys (Presbytis aigula) are abundant, gibbons (Hylobates lar) could be heard only occasionally. No evidence of crab-eating macaques (Macaca irus) could be found.
- Human disturbance: About six or seven years ago, two parties hunted in the southern peripheries of the Mamas basin where they killed four rhinos. The rest of the area is completely unknown to local people, and very difficult to penetrate. Presently, there is no human disturbance in the whole area.

4.2.5 The Silukluk river

- Altitude: The watershed between the Mamas and the Silukluk river is a plateau with an altitude of about 1200 - 1300 m. As the area is flat, it is impossible even with a helicopter, to locate where the Mamas river ends and the Silukluk river starts. The Silukluk flows to the south until it joins the Kompas river at an altitude of about 200 m.
- Morphological features: The western part of the catchment area is flat, the eastern part is steep. The lower half of the river is a relatively broad valley.
- Vegetation: Primary hill and montane forest with natural secondary growth along the river was found.
- Fauna: I surveyed only the lower part of the Silukluk river and found footprints of rusa (Cervus unicolor) and tiger (Panthera tigris) and old elephant (Elephas maximus) paths.
- Human disturbance: The boundaries of the reserve are very close to the lower Silukluk river. At two places, people are cutting ladangs about one kilometer from the river. In the lower part of the river, fishermen are working. There seem to be no hunting activities.

4.2.6 Lower Kompas river

The joined Silukluk and Kompas rivers are flowing in the last few kilometers of the rift valley before it joins the Alas valley at Mara Kompas.

4.3 Other areas

4.3.1 The Gunung Leuser complex

The northwestern part of the reserve and its peripheries are dominated by the Gunung Leuser group of mountains. According to the geologists, this mountain group is definitely not of volcanic origin. The vegetation is damp moss forest in the lower parts, and treeless "blangs" at the mountain tops. As this area is very steep and high, it is not an optimal region for most mammals. For detailed information, see VAN STEENIS (1938).

4.3.2 The Kluet river area

The Bukit Barisan mountain ridge is extending from the Gunung Leuser group to the south, and is forming the watershed between Alas and Kluet rivers. Most of the Kluet river catchment area is steep, high and very difficult to penetrate.
10 or 20 years ago, Pawang Obol from Porang, killed several rhinos in this region. During my survey at the west coast, I found no evidence that rhinos still occur in this area.

4.3.3 The Kluet reserve

The Kluet reserve is situated at the westcoast, south of the Kluet river. A coastal stripe of 200 to 500 m breadth consists of sand and dry soil which is partly cultivated by local villagers. Behind this coastal zone, primary swamp forest extends about 8 km eastwards until Lauf Bangko. The swamp is gradually passing into hilly lowlands covered with primary lowland and hill forest. The Kluet reserve has a rich bird and primate fauna (Orang utan, siamangs, gibbons, banded and silver leaf monkeys, pigtail macaques). No evidence of

rhino and elephant could be found.
The timber company which started to cut timber in the northern part of the reserve in February 1973, could be stopped by the Dinas PPA.

4.3.4 The Bengkong, Karo, Mukab and Serakut areas

The southern peripherics of the Gunung Leuser reserve are relatively flat lowlands covered with primary lowland and hill forest. To the north, the country is slowly ascending to the Bukit Barisan. This southern area has a rich wildlife. Primates, including the Orang utan, are abundant. Rusa, barking deer and wild boars can be found everywhere. A net of elephant trails is covering the area. Two times I found tracks of herds and frequently those of solitary animals.
Two years ago, there were still rhinos in this area but it seems, that probably, they left the Bengkong area due to human disturbance. Local people of the Alas valley and the westcoast are permanently fishing in the Bengkong, the Karo and Mukab rivers.

4.3.5 The Kompas area

The Kompas area is situated in the south of the Mamas basin. In its upper part, the Kompas river is flowing in a relatively flat valley which in the middle part is becoming very narrow and steep. Huge waterfalls are hindering human extension.
The vegetation is primary submontane forest with secondary growth along the river.
At an altitude of about 1400 m in the catchment area, the rhino is abundant. Trails, wallows and a saltlick could be found. In this area I could make a direct observation of a rhino, probably a young female. I found footprints of rusa, serow and a tiger.

5. Rhinoceros

5.1 The rhino range in Aceh

As range I define the area where I myself found tracks, wallows, faeces and other signs of rhinos. Very rarely animals or tracks are recorded by local people outside this area. It seems that single animals leave their usual habitat and wander over great distances. As this seems to occur rather seldom, I do not include these local reports in the range of the rhino.
A few years ago, the rhino seemingly occurred all over the Gunung Leuser area and its surroundings. According to my own findings, they vanished from most of the places cited in the literature and retreated to the central parts of the Gunung Leuser reserve. This central area is about 35 to 40 km long and has a width of about 20 km. It includes from south to north the upper Kompas area, the Mamas river basin and the area between the Mamas and the upper Kluet river (see fig. 3). The Kapi area which is supposed to harbour a rhino population, will be surveyed with the Langkat reserve and the rest of the province of North Sumatra.

5.2 Comparison with KURT's report of 1970

In his report of 1970, KURT listed 33 rhino areas of which at least 26 are located in the Province of Aceh. Kurt visited himself four of these areas and collected data of local pawangs on the remaining 29. Only two of these rhino areas are situated in the present

range of the rhino. One area which was surveyed by Kurt is situated at the edge of the Mamas basin, the other on which he had information from pawangs is the upper Kompas. During part of my survey I visited 14 of the 26 areas and collected recent information about the others, but most of my surveys covered new, unknown areas.

Tab. 1: Comparison with Kurt's report

| Rhino areas listed by Kurt | evidence of rhinos found by Kurt | local information to Kurt in 1970 | evidence found by myself | local information 1971-73 |
|---|---|---|---|---|
| Southern peripheries | | | | |
| 1. Southern Bengkong area | - | + | - | - |
| 2. Laujohar | + | + | - | - |
| 3. Lower Bengkong | + | + | - | - |
| 4. Upper Bengkong | | + | - | - |
| Central Leuser reserve | | | | |
| 5. Lower Kompas | + | + | - | + |
| 6. Upper Kompas | | + | + | + |
| 7. Meranti | | + | - | - |
| 8. Mamas mountains | + | + | + | + |
| 9. Lower Mamas river | | + | - | - |
| 10. Seldok | | + | - | + *1971 |
| 11. Gunung Setan | | + | - | + *1971 |
| Northern peripheries | | | | |
| 12. Ketambe | | + | - | + *1971 |
| 13. Agusan/Blang lima | | + | - | - |
| Western peripheries | | | | |
| 14. Kluet river | | + | | - |

* these data were collected by H.D. Rijksen, Ketambe

As Tab. 1 and Fig. 4 show the range of the rhino in Aceh has shrinked considerably in the past three years. The rhino retreated from all peripheral areas to the center of the Gunung Leuser reserve.

## 5.3 Human disturbance

### 5.3.1 Hunting

It seems that rhino-hunting has stopped in the last three years. I never found a new rhino trap. Only once there was a rumor among local people that a party from Blangkejeren was hunting rhinos. I could never confirm this rumor.
Present hunting activities are therefore not responsible for todays distribution. However, former hunting activities could have had a long term influence on population dynamics.

Borner (2-8)



5.3.2. Ladang and timber cutting activities

In the last few years the human population density in the Alas valley increased steadily. Accordingly the human pressure on the eastern and southern boundaries of the reserve increased. Shifting cultivation and timber concessions were driven towards the boundaries of the reserve leaving practically no buffer zone.

5.3.3. Fishing

Following the increasing demand for dried and smoked sweet water fish, fishermen are penetrating far into the reserve following the big rivers Bengkong, Karo, Mukab and lower parts of Kompas, Silukluk and Kamas as well as the big rivers of the Kapi area. In the Bengkong area for example one or more parties are permanently fishing. Every 2 or 3 km they have built a pondok and sometimes planted vegetables. These fishermen come from the Westcoast and the Alas valley. Usually the fishermen are not carrying firearms. But they kill and hunt animals out of fear. In the Bengkong area I found two new elefant traps and a 4½ m long python which had been killed by fishermen.

5.3.4. Krueng collectors

The krueng oil is used to adulterate nilam oil, which is a high quality perfume base. The krueng oil is collected by cutting halfway into the trunk of a special tree. The cut part is heated with fire and the oil that flows out slowly is caught in a bamboo container. The tree does not recover from such a treatment. As the price of the krueng oil is quite high, krueng collectors penetrate far into the forest in search of the tree. I found evidence of krueng collectors in the lower Alas valley and especially in the Bengkong area.

As there is no hunting pressure at the moment, it could be that the rhinos retreated to the central undisturbed area because of human disturbance by fishermen, peasants and krueng collectors.

Two rhino areas in a completely undisturbed region which were left by the rhinos more than a year ago give evidence that the rhino population is not only retreating to a safer area but also decreasing in number.

5.4. Estimation of number and density

It is extremely difficult to estimate the number of animals because direct observation is nearly impossible and the animals cannot be marked. In the case of the rhino it is even more difficult, as until now only very little is known about its ecology. I myself could not yet collect enough data about the ecology to work out a proper estimation method. I have some data which suggest that the density of the Sumatran rhino is very low. Even in an optimal area the Sumatran rhino is found thinly