

THE GUNUNG LEUSER RESERVE

by Nico J. van Strien

The Gunung Leuser Reserve, actually a group of adjoining reserves, is one of the largest in this part of the world and one of the main "strongholds" of S.E. Asian fauna and flora. More than 6,000 square kilometers of the Sumatran mountains, the Bukit Barisan, are included. Roughly the Reserve covers a stretch of almost 100 km. of the mountain range, just west of the city of Medan. Unfortunately it is almost split in two by the overpopulated valley of the Alas river.

Although the Leuser Reserve can not be called untouched, it still is an area of major conservational importance, and of great scenic beauty. It harbours one of the last thriving groups of the Sumatran rhino together with elephant, tiger, clouded leopard, bear, orang utan, siamang, mountain goat, and many other less conspicuous species. Until now, none of the original elements of the Sumatran mountain fauna and flora have disappeared from the area — which is a rather unique situation. But there are some serious threats, which if unaverted, will bring irreparable damage to the Reserve and could strongly reduce its value in the next few years.

First of all, one should be well aware of the natural structure of the landscape, flora, and fauna of this area. The Leuser Reserve is a mountain and not a lowland reserve. Only a small part (10 to 15 percent) lies below 1,000 meters altitude which is covered with

tropical rain forest. The bulk of the Reserve is covered with mountain or high mountain forest. Although situated in the tropics, higher in the mountains the climate gradually becomes less tropical, and the fauna and flora become less abundant and varied. All the threatened animals are mainly restricted to the tropical zone or occur only in reduced numbers in the higher areas.

Above 2,000 meters, and there are many areas that high (Mount Leuser is the second highest mountain in Sumatra at 3,400 m.), the forest appears to be totally deserted. Birds are seldom seen or heard, butterflies and other insects are rarities; and only the orchids, pitcher plants, and rattans remind one of the proximity to the equator.

Therefore, it is false to claim that 6,000 square km. of tropical rain forest are protected in the Leuser Reserve. Only 1,000 square km. are real tropical rain forest and it is here that the wildlife is largely concentrated. So only a small part of the total area is of prime importance for wildlife, but this is also the commercially exploitable part and therefore heavily threatened at the moment. The process of stripping these areas of the Reserve has already started and is becoming a serious problem.

The first of the reserves was established in 1938. Later some more areas were added and some of the boundaries were marked in the field. However, the other reserve areas were largely left alone. The Leuser Reserve is one of the most remote and isolated areas in Sumatra and well away from urban areas. The mountains are steep, high, and mostly inaccessi-

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ble. Large parts are still unmapped and have never been visited by man. Only scientists and rhino poachers venture into the interior, but all other activities are restricted to the lowlying fringes.

Until some years ago the remoteness and isolation created an effective form of protection against attacks on the reserved forests, but this has changed rapidly. The accelerating population growth has caused human activities to spread into the Reserve—particularly in the Alas valley, which is in the very heart of the Reserve. This process has continued rapidly and has already gravely affected the surrounding forests. In recent years many people have moved in from waste lands in the south and the virgin areas outside the Reserve were quickly logged and transformed into fields. Although the boundaries are marked in the field, they are not respected and deforestation continues inside the Reserve. First the wood cutters moved in, followed by other people, making fields on the stripped plots. Now fields occupy an area 1 to 2 km inside the Leuser Reserve and beyond this for about 4 km. trees are still being cut.

In many other areas this destruction is less extensive, but everywhere around the Reserve the pressure on the border areas is increasing. When people are not forced to respect the Reserve all important areas will be affected with a few decades and perhaps the Leuser Reserve will lose its value for the conservation of tropical nature.

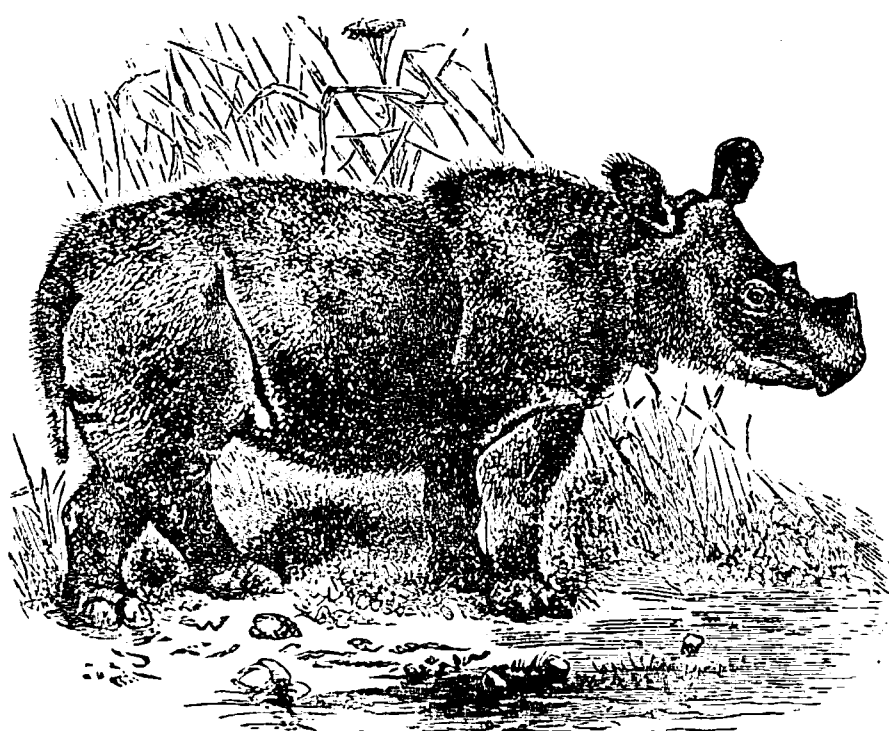
Actually it is a socio-economic problem. Econo-

mic interests in logging are so great and pressure to spread the population so high, that people will not voluntarily respect the Reserve. From the conservation side it is well known that the squatters will not leave unless they are forced to do so. Only when conservation gets full support from all levels of government will the Nature Conservation Department be able to guard the Reserve effectively and make all other interests subordinate. At the moment commercial interests prevail and conservation is only supported when it does not interfere with these exploitative activities.

The fate of various animals largely depends on the future of their habitats. So, if the forests are preserved the animals living there will have a fair chance of surviving, but if the forests are destroyed it will be difficult to save most of the wildlife. Only a limited number of animals are able to live in a human influenced environment, thus most others will disappear along with the natural forests.

For a number of species some other factors are further limiting their chances for survival. These are the species which are closest to extinction (extaille) and need special attention.

For many years the Sumatran rhinoceros (*Dicerorhinus sumatrensis*) has been extaille and the situation presently looks pretty grim for them. The Gunung Leuser Reserve is one of the two or three places on earth where populations of this animal can still be found.



Sumatran Rhinoceros

Formerly they could be seen all over the Leuser area, but during the last ten years they have disappeared from all the border areas and only survive in small numbers in the almost inaccessible centre of the Reserve — above 1,000 meters. This is mainly caused by poaching, but also by increasing disturbance in the border areas by fishermen, farmers, and collectors of forest products.

The story of the rhino is a sad one. They have been removed from 99 percent of their former range by over 100 years of pursuit to supply the market with magical and stimulating concoctions (TIGER-PAPER, III:2, III:3). Already from the beginning of written history very strong healing and aphrodisiac powers were accredited to the rhino's horn and to the rest of its body. Although the belief was more widespread, the trade in rhino products was largely directed to the Chinese. Among them the belief in the powers of rhino horn is still strong and there is still a large demand for this product. With the decreasing numbers of rhino prices soared, but this didn't limit the demand. Rhino horn is still freely traded and available in many drug stores. Also around the Leuser Reserve there are agents willing to buy horns and often send out poachers to get what they want. Last year traps were found twice in the very centre of the Reserve, in which at least three animals were killed, and several times it was rumoured that elsewhere traps were also set. The remoteness and inaccessibility has long protected the rhino, but now that they have disappeared from other areas poachers are not hesitating to trek into the central area. The nature of the terrain makes effective anti-poaching patrol activities rather difficult. When the poachers are in the interior they are quite safe since it is practically impossible to patrol all the ridges and valleys.

The rhino population of the central area can still be called "reasonable" and an estimated 50 animals survive. Paths, wallows, and saltlicks are still regularly used and the finding of prints of a small calf proves that propagation is still going on. With regular patrols in certain strategic areas these animals can probably be saved for the future.

Elephants are not much better off than the rhinos, but their problems are somewhat different. Elephants are not very fond of steep gradients and their occurrence is largely restricted to the lower and flatter areas, e.g. the southern and the northeastern parts of the Reserve. Elephants are great wanderers and in contrast to rhinos frequently leave the undisturbed primary forest to feed on the delicacies of the surrounding fields and plantations. Quite often elephants are reported to leave the Reserve and cause trouble to the local residents. In general, these people are too scared to guard their fields against the raiders with fires, noise, or other means and usually rush off to seek help from the police, or the military to shoot the animals. A too eager granting of these requests has resulted in many unnecessary killings. These ruthless killings, further encouraged by the value of

ivory, have decimated the number of elephants.

The areas of the Reserve suitable for elephants are actually too small. On their extensive wanderings they invariably have to leave the protection of the Reserve and then run into trouble. Only when large tracts of lowland forest are added to the Reserve, e.g. the whole lower Alas valley, can the Reserve have sufficient space for these elephants.

Formerly elephants formed large herds, but this is a thing of the past. Now there remain only a few small groups, none of more than ten individuals, and a number of solitary wanderers.

The third species in need of special attention is the tiger. This huge carnivore still occurs all over the area, but its numbers are never high. They need vast territories to find enough prey. In most areas there



Malayan Bear

is an ample supply of prey, but many tigers cannot resist the temptation of poorly guarded cattle. Now and then a tiger becomes specialised in stealing sheep, goats, and cows from the villagers. This inevitably results in the killing of the animal, and in recent years several tigers were shot around the Reserve. With increasing settlement close to the Reserve and increasing hunting of prey animals, tigers are forced to attack cattle for their food and then risk being shot. It is astonishing to see the kind of corrals the valuable cattle are kept — often in areas where tigers are still common. They are only built to keep the cattle in and not to keep tigers out. Much of the trouble is simply caused by neglect and when proper precautions are

taken, men and tiger can live quite peacefully together.

The last species to be mentioned here is the orang utan. This interesting animal, of which some thousands survive in the Leuser Reserve, is threatened by habitat destruction. They have a rather restricted range on Sumatra and are largely confined to the low-lying forests, and are not likely to adapt to disturbed areas.

The catching of orang utan babies for the pet trade has decreased in recent years, thanks to the active confiscation of these animals by wildlife authorities. But still, the two orang utan rehabilitation stations in Sumatra, are receiving freshly caught animals and an orang utan as a pet is still fashionable (TIGERPAPER III:1).

Apart from these four animals there are many more species finding a refuge in the Leuser Reserve. Next to the orang utan there are siamang and the white-handed gibbon in addition to leaf-monkeys, crab-eating and pig-tailed macaques. Among the carnivores the clouded leopard, the Malayan bear, and the mysterious red dog have to be mentioned. Then there are barking deer, wild boar, mountain goat, and many other smaller species.

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THE ECOLOGICAL EFFECTS OF LAND DEVELOPMENT

by Lee Kam Wing

Throughout history land has been the most sought after and yet one of the least understood of the earth's phenomena. Nearly always it has been regarded as wealth and something to satisfy a demand for food or living space. Rarely has it been treated both as a living entity and a resource in very limited supply. The term land includes soil and topography, in fact, all the physical features of a given location. It reflects the interactions of physical conditions, natural processes, and man's response to them in social and economic situations which dictates the planning and use of land.

The use and misuse of land cannot be overstressed since land development for agriculture, forestry, and mining forms the key elements of the economic development of most developing countries. Developing countries which have abundant land and natural resources, together with a favourable climate constitute a valuable heritage and potential for economic growth and progress.

Land administration is a highly complex matter with many varied interests as well as socio-political overtones. For efficient and ecologically sound use of land, a balanced and progressive land-use policy must be adopted by developing countries which intend to embark on large-scale land development schemes.

During the past decade, a number of developing countries including Malaysia have increasingly emphasised the importance of the role of land development within the context of their national development programmes. In West Malaysia, a dramatic removal of the forest will occur as regional de-

velopment schemes such as Pahang Tenggara and other state schemes are implemented. Considering the number of areas or projects to be developed by as many as 15 different agencies, sufficient coordination and cooperation among all the various implementing agencies and the technical departments regarding the need for a planned and controlled forest clearance is clearly needed.

WATER BALANCE, MICROCLIMATE, AND NUTRIENTS

The plant-soil system of a forest involves an almost closed cycling of nutrients associated with a characteristic pattern of water use. Typically it has complex microclimatic relationships which are very distinct from the changes in the surrounding macroclimate, and its high rate of energy use is expressed in a very high rate of litter production, rapid mineralization rates, and a rapid attainment of equilibrium with respect to organic matter relationships. Further, the plant-soil system is strongly buffered against changes in atmospheric conditions, especially with relation to variability in water supply, air currents, and changing humidity. The effect of seasonality is thereby much reduced and to a considerable degree the system tends to maintain the conditions it requires for its persistence, both in space and time.

Water movement is the vehicle by means of which nutrients are cycled in the plant-soil system. Under the forest is an almost closed nutrient cycle, with little loss to groundwater, and negligible losses in surface and near surface lateral movements. Thus under a forest cover, the plant-soil system is an extremely complex, resilient and stable ecological entity, strongly buffered against change induced by