

SACRED GROVES AMONG THE RUNGUS OF NORTHERN BORNEO:

RELICT AREAS OF BIODIVERSITY

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Human ecology is deeply conditioned by beliefs about our nature and destiny -- that is by religion. ... Christianity made it possible to exploit nature in a mood of indifference to the feelings of natural objects. ... The spirits in natural objects, which formerly had protected nature from man, evaporated. Man's effective monopoly on spirit in this world was confirmed, and the old inhibitions to the exploitation of nature crumbled.

White 1967:1205

Sacred groves among the Rungus served various functions in their cultural ecology and the preservation of biodiversity in the region. However, with the introduction of Christianity and new forms of land tenure, the sacred groves were cut down which had critical environmental consequences.

The Rungus, A People of Northern Borneo⁽¹⁾

The Rungus are an ethnic group of the northern part of Sabah, one of the Malaysian states on the island of Borneo. The following synopsis of Rungus socio-cultural organization is based on the research undertaken in 1959-60 and 1961-62. In the summer of 1986, we returned to the Rungus and found immense changes had occurred. This and subsequent research in the summers of 1990, 1992, 1994, and 1996 form the basis of this discussion of the consequences of ecological change as the consequence of religious change and demands by the government that a new system of land tenure be instituted. In this synopsis I use the present tense for behaviors that still occur, or are shared by most members of the Rungus community, and the past tense for behaviors that are no longer practiced or have largely fallen into disuse.

The Rungus Social Organization

The Rungus social organization is cognatic in that they have no descent groups. Their major social units were the domestic family, the longhouse, and the village.

The domestic family is the only production, consumption, and asset-accumulating social unit of Rungus society. It ideally and most frequently consists of a husband and wife, the two founders of the family, and their unmarried children. Agricultural surpluses of the domestic family traditionally were invested in a variety of brassware, gongs, and ceramic ware.

The longhouse consists of the apartments of the domestic families cojoined laterally. The longhouse has no economic function other than providing a supply of labor during the high agricultural seasons of planting, weeding, and harvesting.

The village was composed of several hamlets in which one or two longhouses were situated. The village was the fundamental political unit of Rungus society. It held residual rights over its land, the boundaries of which were actively defended. Domestic families resident in the village cultivated their swiddens there, but no family from another village was permitted to do so without prior permission of the village headman. No permanent use rights are established by the domestic family in cutting primary forest for its swiddens. Instead, each year a new area of the village reserve is cut, irrespective of who cultivated there in the previous swidden cycle. I have referred to this land tenure system as circulating usufruct (G. N. Appell 1983a, 1986a, 1997a, 1997b).

The Rungus Agroecosystem

The Rungus swidden farming practices formed a complex, multilevel agroecological system. It involved a close interrelationship between the forest, both secondary and primary, and the clearing of fields so that the fertility of the environment was maintained and its continued use ensured. Sacred groves formed an important part of this agroecosystem, as we shall elucidate. The secondary and primary forest also provided housing materials, various raw materials, and sources of food, including wild fruits, roots, and nuts. In addition animals, such as two varieties of deer, the Mouse Deer, the Tembadau, as well as birds and reptiles were hunted for food. The streams provided food of various fish, molluscs, and crustaceans.

The domestic animals -- dogs, chickens, and pigs-- were fed on the foods from the swiddens, wild foods, and refuse from the longhouse. Pigs and chickens were the primary domestic animals used for sacrifices. Water buffalo were raised as beasts of burden, for sale, and to slaughter to provide food for guests at the memorial ceremonies for outstanding individuals.

The domestic family each year planted in its swidden rice, maize, manioc, and a variety of vegetables. After all the crops of that year had been removed, the swidden reverted back into forest and became available for anyone else in the village to use for a swidden. In addition to the swidden crops, cultivars included a large variety of fruit trees and plants for raw materials, including several varieties of cotton for textiles as well as indigo and turmeric for textile dyes.

Religion and The Spirit World⁽²⁾

The Rungus world was indivisible, peopled both by humans and nonhuman agents who have superhuman powers. These nonhuman agents were generally invisible except in unusual circumstances (see G. N. Appell and L. W. R. Appell 1993). The Rungus believed in three classes of suprahuman beings: the *osunduw*, "gods"; the *rogon*, which might be translated as "demigods" or "spirits"; and the *odu-odu*, "rice spirits".

The *rogon* spirits were inhabitants of the natural and social world. They inhabit the same world as the humans do, in both space and time. It is a seamless world.

There were *rogon* in the household, dwelling in the hearth, who protect the household members unless offended. Then, they cause sickness and must be propitiated.

There were *rogon* inhabiting aspects of the landscape that have distinctive feature, such as rock piles, sacred groves of forest.

Finally there were wandering *rogon* who bring the epidemic diseases.

The terms "demigod" or "spirit" only roughly approximates the semantic value of this *rogon* category. While *rogon* were generally feared before Christianity, because when offended they produced sickness, there were also *rogon* that an individual could appeal to for help and who could become an individual's guardian spirit. Sickness was explained as the result of soul loss. A *rogon* would capture one of the several souls of an individual and by various tortures to the soul causes illness. A spirit medium will go into trance and call her spirit familiar to diagnose the illness. When the identity of the *rogon* that is causing the illness is known, a sacrifice of pigs and/or chickens is offered to him to return the soul.

Sacred Groves

Throughout the village reserve, prior to Christianization, there could be found a series of sacred groves which were inhabited by *rogon*. These groves are termed "puru", which is the same lexeme used for islands in the ocean. By referring to these *puru* as "sacred", I do not mean to imply that the Rungus divide the world into sacred and profane dimensions. The world of the Rungus was peopled with suprahuman figures and suprahuman actions. The Rungus individual was constantly working with these suprahuman agents in his everyday life, and these agents would look upon him with favor if he kept the rules of respect. If not, if the relationship were violated, these *rogon* had the capacity to levy sanctions, which varied from sickness and death to infertility of people, animals, and crops. As the whole world had a certain hallowedness, these *puru* represent only an enhanced degree of sacredness, being the residence of *rogon* who must be respected and paid homage.

Puru varied in size from under a hectare in area to 50 to 100 or more hectares.



A very small sacred grove whose boundaries have been invaded bit by bit over the years by escaped fires from the swiddens.

Traditionally these groves were not felled for swiddening because of the fear of that any intrusion would anger the indwelling *rogon*. The *rogon* would then inflict illness on the perpetrator or a member of his family by capturing his or her soul and torturing it. However, these groves at times did have their boundaries intruded upon for swiddening by individual men who were particularly unafraid of challenging the *rogon*, not fearing the consequences.



A small sacred grove in the middle of a swidden

The types of sacred groves inhabited by *rogon* included stands of trees surrounding springs, at places along the river where there is a slimy ooze or seep, in rock slides, banyan trees, and various other locales. A further type of *puru* is one in which there are manifestations of suprahuman action, such as stone figures of a hunter and his quarry overcome by the Flood or footprints in rock of giants, and so on.

Sacred Groves and the Rungus Cultural Ecology

These sacred groves provided medicinal plants, animal protein, fallen wood for fires, rattans for building materials, wild fruits and nuts, and wild roots and tubers.⁽³⁾ At the end of the agricultural year these groves formed an important reservoir of seed and suckers for the regeneration of the forest in the abandoned swiddens surrounding the groves. They thus had a major contribution to the Rungus cultural ecology.

The sacred groves also contributed to the protection of the ecosystem from degeneration. Sacred groves played an important part in maintaining the hydrological cycle, which is fundamental to sustaining biodiversity. The Rungus stated that if sacred groves were cut, in addition to causing illness by angering the resident *rogon*, it would also cause the countryside to dry up. First, the springs in the sacred groves would dry up. Then, without the shade of these groves along the rivers, the pools of water in the rivers would not last throughout the dry season, both as a result of increased evaporation without the shade from sunlight as well as the decrease in seepages into the river system from the springs in sacred groves.⁽⁴⁾

The groves provided a sanctuary for forest biota, a refuge area for species of primary forest vegetation and their associated fauna. The sacred groves may have had other impacts on biodiversity that have not yet been assessed. There is evidence that where they have been cut there is an increase in erosion, particularly along stream and river banks. And there is evidence in other regions of the world that forest cutting produces an increase in stream temperature, affecting the biota of streams and rivers in terms of population size of species, distribution of species, and loss of species (see Swift 1982; also see Wallace, Eggert, Meyer, and Webster 1997).

Furthermore, the tree crowns on the edges of these groves may have had important ecosystem contributions. As yet there has not been a study done in the Bornean rainforest of the impact that canopy edges have for biological diversity. However, Young (1995) reports from his study of temperate forest edges and glades in bushland in East Africa, that while there may be more predation on the canopy edges, canopy crowns adjacent to gaps undergo rapid growth, implying an increase in available carbohydrate. Young (1995) hypothesizes this leads to increased flowering, fruiting, and epiphytic growth. As a result, he argues, these gap-edge tree crowns could be hot spots of resource availability for folivores, floral visitors, frugivores, epiphytes, and associates of these species.

Thus, sacred groves were critical for the preservation of biological diversity.⁽⁵⁾

Destruction of the Sacred Groves

According to my Rungus sources, Christian missionaries from the Swiss Basel Mission argued that if the Rungus converted to Christianity they could fell these sacred groves with impunity. They could then plant crops in these areas and reap significant agricultural profits, as

the soils in these groves were particularly rich never having been cultivated. They argued this even though the Rungus system of agriculture involved farming an area for only one year, or two at the most, before it was necessary to fallow it for regeneration of the forest (see G. N. Appell 1997a).

The Christian missionaries appeared to be particularly aggressive in attacking these sacred groves. They situated the first church in the area within the boundaries of a former sacred grove where the figures from the Flood could be found.

Economic development has also contributed to their destruction. Over the futile objections of the Rungus, a road was bulldozed through the grove containing the stone figure of the hunter and his quarry overcome by the Flood, destroying them. These could have made an interesting tourist attraction as well as keeping alive Rungus mythology, which is critical for a population's adaptation to change (Appell 1986b, 1997a).

Economic development also included changes to the land tenure system. The government required the Rungus take up land in individual ownership for agricultural purposes and put in plantations of coconut and rubber. The surveyors marking out the boundaries of individually titled land holdings included in these parcels of land sacred groves, which had been of benefit to the whole community. In some instances the *rogon* in these groves had been propitiated to for help and protection by various members of the community. But as a result of not scheduling these as a community resource but allocating them to individual title, the individual owner had to pay his yearly tax for agricultural use on forest land that traditionally could not be felled. This shift to an emphasis on individual benefits with community benefits ignored encouraged the owner to fell these groves.⁽⁶⁾

Ecological Consequences of the Destruction of the Sacred Groves

Deterioration of the Local Hydrological Cycle

The yearly rainfall regime in the Rungus area involves a dry period each year from April through September (see Table One).

At the time of our original field work, the river on which we were living in the middle of the Kudat Peninsula dried up into small water holes unconnected by any flowing water during the months of August and September, just prior to the beginning of the northeast monsoon. At that time the Rungus depended for drinking water on wells dug in the dry river bed. Even in the worst years, most of the water holes, we were told, dried up so that the wells had to be depended upon not only for drinking water but also for washing and bathing. At the end of this dry season, just before the northeast monsoon begins usually in October, the Rungus fire their swiddens and plant their rice and maize.

When we were permitted to return to visit the Rungus, during our field sessions of beginning in July of 1986, 1990, 1992, 1994, 1996 (with various stays that included March, or other months through August) we found that the water flow in the river had ceased altogether. In the

past there would have been a flow during these months. Furthermore, we found that the size of the remaining pools during the dry season were smaller and they had become increasingly stagnant so that in 1992 it was impossible to use them for bathing or drinking water. Saplings were growing in the dried up river bed where once there had been flowing water.

Table One

MEAN ANNUAL RAINFALL IN THE KUDAT PENINSULA PRIOR TO THE DESTRUCTION OF THE FOREST^(A)

	<u>Langkon Estate</u> ^(B)	<u>Kudat</u> ^(C)
January	16.20	12.18
February	7.80	6.12
March	7.54	6.47
April	5.31	3.23
May	5.80	4.39
June	5.69	5.01
July	3.92	4.30
August	4.25	4.82
September	4.79	4.82
October	6.61	7.24
November	6.99	11.49
December	16.15	19.55
Total	91.0	89.53

^(A) Statistics compiled by the Department of Civil Aviation and Meteorological Services, British Borneo Territories, for the period 1896 through 1957.

^(B) Statistics based on 23 years of observations at the station on Langkon Estate. This station is located at the southern edge of the Rungus territory.

^(C) Statistics based on 34 years of observations at the station in the town of Kudat through 1957. This station is located at the northern edge of Rungus territory.

The desiccation of the environment is serious and is constantly remarked upon by the Rungus. It has become so bad that the government began to bring in water by truck and has now built a permanent water system to pipe in water from a distant river, which also has had its flow of water decreased due to the destruction of forest in its upper reaches as a result of logging.

There are two competing explanations for the desiccation of the Rungus environment. The government representatives blame the situation on a major but temporary climatic shift.⁽⁷⁾ And undoubtedly this may be a factor. If it is, it hides the linear deterioration in the hydrological cycle as the result of the destruction of the forest. And no one knows to what degree a major

shift in rainfall regimes may not itself be a product of the forest cutting (see Becker 1990:114 who argues that deforestation would discourage convectional rainfall).

The Rungus blame the lack of water in the river on the cutting of the sacred groves, including those along the river banks. And they are undoubtedly right as these did perform an important function in the hydrological cycle. If there has been a temporary shift in rainfall regimes, this loss of forest cover exacerbates the water problem.

There are several functions that sacred groves play in maintaining a healthy hydrological cycle. A multistoried, heavily canopied forest slows rainfall runoff. The canopy helps break the impact of the rainfall, allowing the water to trickle down branches and tree trunks. I made several observations of the time between the end of rainfall and the cessation of leaf drip in a grove of secondary forest. There was a continuous drip of significant rain water from leaf to leaf for over 18 hours afterwards. Thus, rainfall percolates steadily into the soil and runs off into the rivers at a gradual rate (see Myers 1984:262), rather than rushing out to sea from those areas with minimal forest cover. And deep roots aid the infiltration of the water into the soil. The high transpiration rate of such forests returns water to the atmosphere to fall again as rain. Thus, when the forest cover remains intact it acts as a sponge, slowing the runoff and releasing moisture at a slow regular rate (Myers 1984:262, 281). Furthermore, the transpiration from trees in the groves provides hygroscopic nuclei for stimulating condensation in a humid environment and creating rainfall.

Our understanding of sacred groves as a source for maintaining a functioning hydrologic cycle is, of course, far from complete. But there has been a recent discovery by plant ecologists which supports naturalistic observations by the Rungus themselves. In a process that has been termed hydraulic lift, trees bring significant amounts of underground water to the surface. In the night, "many plants pull up water from deep in the earth and, rather than holding on to it to pass through their leaves the next day, they flush it out through their shallow roots into the ground around them" (Yoon 1993:C1; see Dawson 1993a, 1993b). Trees in this manner lift water that is stored deep in the ground. For example, it has been estimated that a 40 foot tall sugar maple can deliver between 40 and 50 gallons of water to the upper soil layers every night (see Dawson 1993a, 1993b).

The effects of hydraulic lift in sacred groves were observed by some Rungus. Sources pointed out that in the morning one could see a mist rising from the ground in these groves, indicating that these groves are a source of water. During field work in 1994, I explained the concept of hydraulic lift to several Rungus friends. The Assistant Native Chief, on hearing this, exclaimed that this explained an observation he had made of a sacred grove in his youth. When he passed it in the morning on the way to his fields, a stream was running out of it. But on the way back in the late afternoon, he could cross this stream bed without getting his feet wet. The stream had dried up.⁽⁸⁾

Disappearance of Wildlife

Since we first started working among the Rungus in 1959 we have observed the disappearance of a number of species around our research site in association both with the felling

of sacred groves and the increased planting of permanent agricultural crops. The Sambar (*Cervus unicolor*), Barking Deer (*Muntiacus muntjac*), and Mouse Deer (*Tragulus javanicus* and/or *Tragulus napu*) have all but disappeared, as has the Bearded Pig (*Sus barbatus*). We saw the last Tembadau (*Bos javanicus*) killed in the area in 1962.

Also gone are the Proboscis Monkey (*Nasalis larvatus*), which used to inhabit the now long cut-over forests that paralleled the banks of the estuary of the river, and Bornean Gibbon (*Hylobates muelleri*) populations, which ranged through several of the sacred groves that no longer exist. Pig-tailed Macaques (*Macaca nemestrina*) have all but disappeared. And a number of bird species are no longer present. These include Hornbills of various species, the Common (*Alcedo atthis*) and Stork-billed Kingfisher (*Pelargopsis capensis*), Large-billed Crow (*Corvus macrorhynchos [coronoides]*), etc.

We have yet to ascertain the consequences of the loss of sacred groves to the botanical inventory.

CONCLUSIONS

According to White, the spread of Christianity in the Mediterranean basin led to the destruction of the sacred groves protected by the pagan religions, and this was partially responsible for the desiccation of that region (White 1967). The spread of Christianity had similar impacts on ecosystems in other parts of Europe. Davies (1984:292) writes that with the joining of medieval Lithuania with Poland, the pagan religion of the Lithuanians "was abolished, the sacred oak groves ritually felled, and the people baptized in legions."

White has thus argued that Christian theology has contributed to our ecological crisis because of its "axiom that nature has no reason for existence save to serve man" (White 1967:1207). Christianity "not only established a dualism of man and nature but also insisted that it is God's will that man exploit nature for his proper ends" (White 1967:1205).

However, Hughes and Thirgood (1982) argue that the ecology of the Mediterranean Basin was already in decline prior to the arrival of Christianity, as a result of deforestation through overuse and the subsequent social erosion. Wood products had become very scarce, and I suspect that the value of sacred groves as a source of wood began to outweigh their religious values, particularly since another religion was available. So it was a combination of religious change and economic demand that led to the desiccation and ecological decline of the region. These same factors are operative among the Rungus.

Furthermore, there is nothing inherent in Christianity, some authors argue, that is inimical to the protection of the environment (see Breuille and Palmer 1992). Instead, argues Palmer (1992) it was the impact of Protestantism that seemed to have brought about the significant change in human-environmental relations.

However, related to the advent of Protestantism were two other factors. First there has been the rise of the corporation as an economic organization with its capacity to externalize costs to other sectors of society. International corporate enterprises now penetrate some of the most

remote places of the globe, interfering with the local system of ecological exchanges through offering a variety of goods, through mining, through cutting the tropical forests, and through plantation agriculture. Associated with this has been the development of economic thinking as a closed system of analysis divorced from the actual interrelationships that the economy has with other sectors of the social system. And this leads to the development of what I have called economic fundamentalism (G. N. Appell 1991a).

The destruction of sacred groves among the Rungus is thus a product of secular ideas about the environment from both Christianization and economic development policies, and this latter compounds the erosion of religious belief and the disarticulation of a population from its ecosystem (see G. N. Appell 1991a). It has been argued that economic developments introduced by the British colonial government in India resulted in a major degeneration of the environment and increased poverty in certain sectors of the population (Gadgil 1985, 1992; Gadgil and Chandran 1989).

As a consequence of these factors sacred places of indigenous and peripheral peoples are ignored and destroyed without realizing the environmental consequences or the uses they have in contributing to sound development (G. N. Appell 1991a, 1992). Furthermore, it must be remembered that any of these changes in the system of interlinkages of a population with its ecosystem, whatever the cause, has health consequences, which complicates the adaptation of indigenous peoples to modernization and adds to its cost (see G. N. Appell 1986b). But these health consequences are not seen as a cost of economic development (G. N. Appell 1988a). The attendant consequences that bring about social and ecological dislocations are ignored. Instead these costs are externalized to the whole society.

In the past those of us concerned with the protection of human rights have at times been at loggerheads with both developers and conservationists. In their attempts to preserve the environment conservationists have overlooked indigenous occupation and use rights. Those in charge of economic development also frequently ignore the rights of indigenous peoples. Here in the area of sacred groves we can work together to solve a human rights problem--the destruction of property that is considered sacred; the environmental problem of protecting biodiversity; and at the same time we can contribute to a more sound economic development by saving sacred places as tourist attractions.

NOTES

1 I owe a particular debt of gratitude to my wife, Laura W. R. Appell, who participated fully in research among the Rungus as well as in the continuing analysis of data. For further information on Rungus society see G. N. Appell 1965, 1976, 1978, 1983b, 1984, 1987, 1988b, 1991b; L. W. R. Appell 1988, 1991; Amity Appell Doolittle 1991.

2 Religion, with the exception of certain aspects of the agricultural ceremonies, lies in the hands of Rungus females. Without the help of my wife it would have been impossible to gather data on this realm. See G. N. Appell and L. W. R. Appell (1993) for a more complete discussion of the Rungus religion.

3 Sacred groves were almost universally found among human populations before conversion to a world religion. See in particular Lehman's contribution to this volume. Also see the report by Lebbie and Guries (1995) on the dependency of the Kpaa Mende in Sierra Leone on sacred groves for medicinal plants.

4 Ancient writers in first century B.C. and the first centuries A.D. noted how forests preserved the flow of water in springs (see Hughes and Thirgood 1982:201).

5 See Gadgil and Vartak (1976) and Gadgil (1992) for a discussion of the problem of loss of sacred groves in India and the biological consequences. See Smith (1983) for a discussion of the function of similar reserves in the Amazon jungle. Also see Guha (1998) and Sarin (1998).

6 Colchester (1993:84) reports that the Ho tribe in Bihar have lost their rights to forest lands as the result of government decrees. In response they have "mobilized against official forestry programmes and developed a 'forest cutting movement'. Despite having an ancient tradition of respect for sacred groves for religious ceremonies, the Ho have turned to forest clearance as a means of asserting their rights to use the lands which forest laws deny them."

7 A former chief minister of Sabah, with a degree in law, wrote to the author that weather patterns all over the world had changed and that this is affecting Sabah. He opined that it might be the result of nuclear testing or the influence of various planets which would be gone by the year 2000.

8 Even in classical times in Greece and Rome, Hughes and Thirgood (1982:202) point out, there were observations on the impact of deforestation on the hydrological cycle and its consequences in desiccating the environment.

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