Gaddang Rice Cultivation: A Ligature Between Man and Nature 1

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There is general agreement within the social and biological sciences that the relationship between man and his physical environment is one of reciprocity. Man, as a culture bearing animal, affects his environment and the environment affects the culture of man. But man, the hunter and gatherer, modifies his environment in a manner unlike man, the wet rice agriculturist. A man living in the Sulu archipelago is affected by his environment differently from a man living in the Batanes. In other words, the relationship that exists between man and nature is conditioned by the type of habitat in which man lives and the way in which he modifies it. The purpose of this paper is to examine selected aspects of the relationship between man and nature as among the Pagan Gaddang of northern Luzon. The focus of the paper is rice cultivation. No attempt is made to discuss in detail the total ecological system.2

The subjects of this study are the Pagan Gaddang of the Cagayan Valley and the eastern parts of Bontoc and Ifugao sub-provinces. There are approximately 2,500 speakers of this dialect of Gaddang.3 The research does not consider the Christianized Gaddang of Isabela or Nueva Vizcaya.4 Although they and the pagan population speak a mutually intelligible language, culturally they are quite distinct. The Pagan Gaddang have maintained a culture of their own, not having significantly adopted the ways of the lowland Filipinos. The Cagayano (the Christianized Gaddang of Isabela) and the Gaddang of Nueva Vizcaya, on the other hand, consider themselves Filipino Christian men and women. Superficially, it is difficult to distinguish culturally between a Christianized Gaddang and any other rural Filipino residing in the area. The Pagan Gaddang, as viewed by the

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² Ecological system or ecosystem, as used here, has been explained by C. O. Frake, as follows: "If the social system be envisioned as a network of relationships among the persons of a

social community, then the ecological system is a network of relationships between man, the other organisms of the biotic community, and the constituents of his physical environment. In both cases the networks are, of course, interconnected at many points." "Cultural Ecology and Ethnology." American Anthropologist, 64:1 (1962) 53-59.

³ M. Troyer. "Gaddang Phonology." The Philippine Journal of Science, 88:1 (1960) 95-102.

⁴ See G. Lambrecht. "The Gadang of Isabela and Nueva Viscaya: Survivals of a Primitive Animistic Religion," *Philippine Studies*, 7:2 (1959) 194-218. "Anitu Rites Among the Gaddang." *Philippine Studies*, 8:3 (1960) 584-602.

Christianized Gaddang, are not Gaddang; they are "Kalinga." They are considered to be wild and dangerous people who live in the forest. In short, the Christian-tzed Gaddang have been assimilated into the mainstream of rural Filipino cultural values while the Pagan Gaddang have maintained their ethnic identity.

The writer has been conducting research in a small Gaddang settlement consisting of thirty-three individuals, occupying eight houses. This settlement, Pakak, is located at an elevation of about 700 feet in the foothills of the eastern slopes of the Cordillera Central in Ifugao. The Pakak forest basically conforms to what Dobby has called a "moonsoon forest."5 It is characterized by a short During these months the dry season. trails are covered with dust, and cracks can be seen in the soil of most areas not protected by vegetation. There is less plant diversity at Pakak than is found in a rain forest. Pakak is part of a forest that follows both sides of the winding Taotao River from the lowlands to its headwaters in the mountains, a distance of perhaps forty kilometers. But, as the forest is seldom more than a kilometer wide at any one point and the banks of the Taotao are very precipitous, the actual land available for cultivation is much less than it might appear. The lack of cultivatable land is compounded by the fact that the forest is banked on both sides by imperata, cogon grass.

Of the eight households in Pakak, scattered within an area of approximately one square kilometer, only two have been there as long as six years. All of the peo-

ple at Pakak came from a one time lowland forest located about five kilometers away. Because the forest in which they once lived was over-cultivated and the land was no longer suitable for growing dry rice by slash-and-burn farming, they had been confronted with the choice of either changing their system of plant cultivation or moving to a new forest. The subsequent move was in line with a cultural preference for dry rice grown by slash-and-burn and the belief that there is always a new forest to cultivate. This is a clear example of the subtle relationship between physical environment, plant cultivation, and society. Man, because of his system of farming, modified his physical environment to the point that it became incompatible with certain cultural beliefs and the method of plant cultivation itself. In response to the changing environment, rather than adopt new farming techniques that were available and abandon cultural value, it was necessary to move to a new location. Because of the system of cultivation, the move was limited to a particular type of environment.

Pakak is representative of other Gaddang settlements practicing swidden cultivation. A crop year is divided into two seasons, the "rice growing season" (aba-

⁵ E. G. H. Dobby. *Southeast Asia* (London: University of London Press, 1954), p. 62.

⁶ The writer has recently been studying two Gaddang settlements, one practicing shifting cultivation and the other using the carabao for tilling the soil. The field work period extended from October, 1965 to December, 1966. The generalizations here are only applicable to Gaddang settlements practicing slash-and-burn cultivation. The term "swidden" has now been established in the literature replacing kaingin, shifting cultivation, and slash-and-burn cultivation. See H. C. Conklin. "The Study of Shifting Cultivation." Current Anthropology, 2:1 (1961) 27-61.

fini) and the "other plant growing season" (mamula), the former lasting from about August to December and the latter from January to July. The major plant domesticates to be found growing in and around swiddens during the rice season at Pakak are as follows: rice, bananas, wingbeans, lima beans, sugar cane, eggplant, white and orange squash, camote, and papaya. During the "other season" there are: tobacco, millet, bananas, mungo beans, onion, eggplant, papaya, and pineapple. In other words, it should be emphasized that a swidden does not house a single crop, just as a forest does not have a single type tree. Since the crops are planted at different times during the year and because their maturation is not uniform, a Gaddang swidden. with its inter-cropping and boundary cropping, is a mixture of foodstuffs for most of the year. This point may be illustrated by citing a part of Conklin's vivid description of a Hanunóo swidden. He says, "Over the first two years a new swidden produces a steady stream of harvestable food in the form of seed grains, pulses, sturdy tubers, underground stems, and bananas, from a meter below to more than two meters above the ground level."7 The statement is applicable to Gaddang swiddens except that they show less elaboration than those reported for the Hanunóo. Possibly because the Pakak forest is "naturally" less diversified than the Hanunóo forest, there is also a smaller number of domesticated plants. For example, Conklin has noted that a Hanunóo informant drew an ideal swidden containing forty-eight kinds of food plants.8 Ideal swiddens described by Gaddang informants contain only ten to fifteen different types of food plants.

Furthermore, there is considerable amount of household variation in Gaddang swidden cropping. For example, one household may plant millet, a second tobacco. while a third may plant both millet and tobacco.

The noteworthy plants not grown at Pakak are the betel and coconut palm. Betel nut has particular personal and social value. Almost all adult Gaddang chew betel nut as a personal habit. Betel chewing is associated with the small talk preceding serious discussions, or if two Gaddang meet along the trail, the accepted behavior is to rest, chew betel nut, and talk. Because the betel and coconut palm do not bear fruit for several years after planting, the people at Pakak consider growing them an unproductive endeavor. They do not own the land they cultivate and few expect to be in the area long enough to reap the fruits of many seasons.

The minimal social unit among the Gaddang responsible for the preparation, cultivation, and harvesting of a swidden is the tabalayan ("one house") or household. The most common type of household is comprised of a complete nuclear family, consisting of husband and wife (as polygyny is rare), with or without offspring. But a household may also consist of a divorced or widowed individual. with or without children, or an adult individual who has never married. In the latter case, this type of household seldom occurs among women.

The members of each household occupy a single dwelling. If possible, a Gaddang family will construct its house in the forested area along hilltops. Such a location affords a certain degree of privacy, convenient access to swiddens, and a good vantage point for observing the surrounding countryside. Like swiddens and swidden crops, there is consi-

⁷ H. C. Conklin, Hanunóo Agriculture in the Philippines, Rome: Food and Agricultural Organization of the United Nations, Forestry Papers, XII, 1957, p. 147.

8 Conklin, op. cit.

derable variation in the size and shape of Gaddang houses. The smallest house in Pakak has a floor space of forty square feet and the largest, a floor space of one hundred and fifty square feet. The houses average an area of approximately seventy-five square feet. All Gaddang houses are constructed on upright posts or trees serving in their stead. The floor, however, may be only a meter or as much as three meters above the ground. The walls may be of split bamboo, plaited bamboo, upright bamboo, a variety of grasses, or a combination of two or more of these. House variation is but another recurring importance example of the placed on the individuality of the household in Gaddang society. The accessibility of an assortment of forest building products, of course, contributes to this range of house types. If a narrower choice of house building materials existed, there might be more uniformity. All Gaddang houses are similar in general design. There are no interior partitions and there is a single hearth area. The roof is of cogon thatching and the floor is of split bamboo. As a rule, very small houses are considered temporary structures in which to live while the household is preparing a new swidden. In actuality, many Gaddang never get around to constructing a larger and more durable type of house.

Gaddang households and settlements are small. At Pakak, for example, there is an average of four persons in each house, the largest three households consisting of six individuals and the smallest of one person. There are fifteen houses at Pakak, eight of which are occupied. The others were abandoned during the last six years. Although there are examples of close kin building homes near one another, there are no cultural prescriptions as to where a house must be located

within a settlement. Gaddang houses have no commercial value and are abandoned when the new swidden of the household is sufficiently distant to warrant building a new house. Viewed from the air, a small Gaddang settlement with its scattered houses and granaries, its paths, its swiddens and its forested areas, is a patch-work illustrating how man and nature influence one another.

The relationship between man and nature may be further illustrated by examining Gaddang rice cultivation. It is the interplay of man and plants that allows for a better understanding of what is happening within the ecosystem.

When a new swidden site is needed. the head of the household will generally make his selection during February or March. The most common practice is to select and prepare a new site after farming the current swidden for three years. A new site might be selected and prepared sooner if the current swidden needed enlarging or was unproductive. In selecting it, all land is considered cultivatable except areas where cogon is present. Given the characteristic of the environment that almost all terrain in the area is either covered by cogon or forest, the primary consideration in the selection of a future farming plot is that the area be heavily wooded. The thicker the vegetation, the better the plot. This means, of course, that an ideal swidden site has a relatively high rate of decomposition and regeneration. The Gaddang, then, select the potentially most productive areas in their ecosystem to support their type of cultivation. For the most part, little consideration is given to drainage, stones in the soil, or the general slope of the land.

There are no cultural taboos regarding the selection of a site nor is there ritual testing of one. A swidden may even

be placed over a grave provided this is done with the permission of the relatives of the deceased. The only cultural factor that prohibits a household from using a particular piece of land for a swidden, other than that the site already belongs to another household, is a confrontation with a "bad sign" when the area is first visited for the specific purpose of surveying it as a potential farming plot. Informants agree that there are five of these omens. If a man sees a snake hanging from a tree, if a kingfisher crosses his path, or if he hears a deer calling, a lizzard chirping, or a child sneezing in the site. he will have to abandon his plans and go elsewhere. If he were not to do this, illness would surely befall his house. One household's misfortune is not the fate of other Gaddang. Another household may feel free to work the area.

A conflict of interest over the selection of a site is a rarity. This can be attributed to the fact that Gaddang settlements are small and it is necessary to respect the needs and wishes of another household to maintain harmony within the settlement. Once a man makes it known that he has chosen a particular site (and this is accomplished by simply telling his neighbor), his claim to the site is respected. No devices other than natural landmarks are used in defining the area. A Gaddang will let it be known that he will clear the area between perhaps a certain acacia tree and an outcropping of rocks. If a person were not to honor the swidden rights of another man, he would be publicly ostracized and ultimately forced to leave the community. But, as noted, swidden site disputes are uncommon. The writer is aware of only one case where a dispute over a swidden resulted in one party leaving the community and even here other factors, were involved.

For purposes of convenience and economy of labor, a new swidden is located near an older one whenever possible. Informants agree that if a new swidden is more than approximately one-half hour walking distance from the old, a new house ought to be constructed. A swidden may be completely irregular in shape. Its size depends upon the needs of the household responsible for its cultivation and the available land. In Pakak, largest swidden is roughly 6,500 square meters and the smallest about 200 square meters. A household may farm one or more swiddens. Sometimes the fields are contiguous and other times they are not. In selecting a site, a household considers the productivity of its present swidden and other sources of income, e.g., working in the lowlands, selling bamboo, rattan or other forest products to lowlanders, or renting carabao. Again, the household asserts its individuality.

Man becomes a significant force in his ecosystem when he modifies his physical environment by cutting his swidden site. The process of cutting begins during the month of March. Utilizing two types of bolo and occasionally a digging bar and an axe, a man cuts his site. This work is the responsibility of the male head of the household, although he may be assisted by a friend or by older male children. The only time the aid of a neighbor is needed is when felling relatively larger trees to require cutting from a scaffold. Cutting the area may take one day or a depending upon its size, the growth, and the speed at which a man chooses to work. It is necessary, however, that the clearing be completed about one month before burning so that the felled trees and bushes may dry. Like selecting a swidden area, unless a person encounters a bad sign when first starting to cut the site, there are no associated rituals or taboos.

In cutting a new site, a man starts with the bushes and grasses, gradually working up to the larger trees. The smaller trees and sapling are cut anywhere from a few inches to eight to ten feet above the ground. Large trees are generally left standing. They are, however, frequently topped and their branches removed. It is necessary to leave a few stripped trees standing to accomodate the climbing plants that will later be grown in the swidden. A recently cut swidden site is in appearance a scattered stand of naked trees projecting upward from a mass of cut grass, bushes, trees, and general debris. The debris is left as it fell and allowed to come under the effect of the drying sun for one to two months.

Informants say that a good burning of a new site is necesary for the healthy growth of their crops. That is, the debris in the area should disintegrate or be well charred by the fire. Large trees and logs are, of course, more scorched than charred. In their own way then, the Gaddang are aware that a good burning of a new site accelerates the process of decay and increases the amount of energy available for utilization by their domesticated plants. During April or May, aware that the heavy afternoon rains will soon commence, a Gaddang man burns his swidden site. Like the preliminary steps in farm preparation, burning is done without any form of ritual and assistance from a neighbor is generally not needed. Few preparations are made for controlling the fire. Unless their current swidden or house structures are in imminent danger, the Gaddang see no harm in the fire spreading beyond the designated burning area.

If there is no strong wind, the site is burned from all sides. When a strong wind does prevail the fire is started at the windward side of the site. In case of uneven burning, the smaller bushes and trees are thrown into piles and new fires are begun. Stumps, trees, and large logs are not refired and lie among the ashes. For the next month the burned swidden site, covered with ashes, charred materials, scorched logs, and general debris remains untouched by man and the regeneration process brings forth new life.

The Gaddang regard rice as the most important of all their crops. It not only has food and gustatory value but ritual significance. There is a specific terminology associated with swidden preparation and rice cultivation that is not applicable to other crops. To make reference to the "rice-growing season," the Gaddang use a special term, abafini. To refer to the non-rice season, the general term for "domesticated plant" (mamula) is used, mamula si uma, for domesticated "plants in the swidden." Calendrically, the Gaddang year begins with rice planting and events are often associated with reference to a particular rice-growing period.

In July new plants, drawing energy from the ashes and decomposed materials, and nourished by the afternoon showers, begin to appear in the swidden site. At this time, the members of the household carefully clean the ground of all new plants. Only stumps, large logs, trees and stones are left intact. In other words, the swidden site, once covered with piles of debris, is transformed into a manicured swidden plot or uma.

Two or three days before the planting of the rice (apay), the members of each household gather in their house to perform the mimunaw, a rice plant rite. The ceremony is exclusively a household affair and except for a religious specialist, generally an old woman, there are few outsiders present. The mimunaw is not

an elaborate ceremony with many participants and visitors. It consists of little more than the cooking and eating of rice and the utterance of a prayer by the old woman asking that the rice be protected from disease, insects, and predatory animals. The ritual is conducted for the household by the old woman, with its members being mainly interested bystanders.

Rice planting is usually a joint effort on the part of the adult members of two The households. or more households. generally working contiguous or nearby swiddens, agree to assist each other in the planting. The labor force usually ranges between five and ten persons. Swidden contiguity appears to have greater relevance than kinship in the composition of the work force. Aid may be requested from either a relative or a non-relative. During planting, which takes about one day, the owner of the swidden expresses his appreciation to his helpers by having on hand food and drink for their mid-day and evening consumption.

The mechanics of planting the rice following the clearing of the swidden of all debris is a relatively simple matter. The work force punch small holes in the ground, a few inches deep and about one to two feet apart, with a stick that is sharpened at the end. Into each punched hole, ten grains are dropped. Little effort is made to plant in straight rows. The logistics, however, of several people working in the same confined area brings order to the planting, i.e., the workers tend to work in rows. Rice is planted around stumps, trees, logs, and large rocks in the swidden. The grain is not covered and the area must be carefully watched until there is a heavy rain. Otherwise, birds would carry away the exposed grain.

When the rice begins to bear fruit. the swidden must be placed under close surveillance to protect the crop from domesticated animals, wild pigs, monkeys and birds. Unless near a path commonly frequented by man or carabao, it is not protected by a fence. Shelters of bamboo or other available materials or tree lookouts are used for sitting in while watching the swidden. In both cases, a member of the household (often a child) goes to the lookout early in the morning and watches the swidden until dark. Besides the obvious techniques of shouting or throwing stones and sticks to ward off intruders in the swidden, noise-making devices and scarecrows are used. In Pakak, birds are a more serious threat to the rice than wild pigs or monkeys. Although causing damage several times, wild pigs and monkeys have destroyed a rice crop only twice in the past five vears. Domesticated animals are no serious problem because they can be more easily controlled.

The day before the harvest, usually in late November or early December, a brief rice harvesting rite, similar to that at the time of the rice planting, is held. It is a household affair. Rice is eaten and a religious specialist utters a short prayer in appreciation of the rice to be harvested.

Each household harvests its own crop, which is cut with a small hand tool and tied into small bundles. At the point of tying, just below the grain, the bundle is about two inches in diameter. One bundle in Gaddang terminology is a tatak, literally one tak. Eight small bundles are then tied together to form a tarot or one rot. There are approximately eight rot to one cavan of rice. The Gaddang tie the rice for convenience in carrying, storage, and handling in the home. A family of five will eat from six to eight

tatak, that is, about one to one and one-half gantas of rice each day.

Since most members of a household share in the work, harvesting the rice crop takes an average of about five days. The bundles of grain are carried by hand to a nearby cage-like structure where they are left two to three weeks for drying. They are then removed to a granary. Two rot are placed in a corner of the granary and will not be touched, even if there is no rice to eat, until they are used at the mimunaw ritual the following year.

In 1965, the Gaddang at Pakak devoted approximately 19,985 square meters, about two hectares, of land, to rice. The rice swiddens ranged in size from 800 to 6,500 square meters. One household planted rice in two swiddens, the others in only one. The yield from the total area cultivated was 125 rot, or roughly 64 rot per hectare. That is, the people of Pakak harvested an average of only 8.0 cavans of rice per hectare. This yield figure is based on the rice harvested by six households; two households did not grow rice in 1965. The latter two households acquired their rice throughout the year by selling and trading forest products and working in the lowlands. Even for rice grown by swidden, 8.0 cavans per hectare is a low figure. (See Table 1.) This seemingly poor yield can, in part, be accounted for by the fact that the rice was greatly affected by the stem-borer. In 1964, the rice yield is estimated at 28.0 cavans per hectare and in 1963, 33.5 per hectare. In these years, the crop was relatively free of insects and disease. The Gaddang at Pakak are aware of insecticide for rice but they do not use it. Their general philosophy on plant disease is there is little that can be done about it.

TABLE I

Comparative Rice Yields from
Swidden Farming⁹

Location	Cavans per hectare
Mandaya, Philippines	10-70
Hanunóo, Philippines	53+
Central Vietnam	50
Iban, Sarawak	33-44
Malaya	30
North Burman	. 30
French Indo-China	26
3rd Division Sarawak	17
Kapit District, Sarawa	ık 17

Three first year rice swiddens were harvested at Pakak in 1965. One swidden yielded 15.0 cavans per hectare and the others, 6.0 cavans per hectare. However, since this was a year of the stem-borer, these figures are not representative of the "normal" yield from a first year rice swidden. In an attempt to arrive at more representative yields for first, second, and third year rice swiddens, the writer found it necessary to utilize most of the yield figures cited by informants covering a period of six years. That is, since some of the swiddens are new, some in their

O This table is only useful for superficial comparative purposes. Since the critical cultural and environment data affecting the yields cited are not presented extreme caution should be exercised in drawing conclusions from the table. The original terms of quantity were transposed into cavans per hectare by the writer. The table is compiled from the following sources. Mandaya: A Yengoyan, cited in C. Geertz. Agricultural Involution: The Process of Ecological Change in Indonesia, (Berkeley: University of California Press, 1963), p. 22. A Yengoyan, "Survey Reports on Some Tribal Communities in Davao, Surigao and Agusan," 1960. Mimeo Hanunóo: Conklin, op. cit., p. 119. Central Vietnam: P. Lafont. "The 'Slash-and-Burn' (Ray) Agricultural System of the Mountain Populations of Central Vietnam." Proceedings of The Ninth Pacific Soience Congress, 7:56 (1957). Iban, Malaya, North Burma, French Indo-China, 3rd Division Sarawak, and Kapit District, Sarawak: J D. Freeman, Iban Agriculture: A Report on the Shifting Cultivation of Hill Rice by the Iban of Sarawak, (London: Her Majesty's Stationary Office, 1955), pp. 96-97.

second year of cultivation, and others in the third year, rice yields from the first year swiddens of 1963 were combined with yields of the first year swiddens of 1964, the second year swiddens of 1962 with the second year swiddens of 1964, etc. It should be emphasized, however, that the data presented here are only as reliable as the memory of the writer's informants. The estimated rice yields from first, second, and third year swiddens at Pakak are, as follows:

Year	Cavans	per hectare
1st		20-50
2nd		15-30
3rd		30-20

In two cases, the writer felt that the informants were particularly reliable. Their swiddens yielded, as follows:

•	Year	Cavans per hectare
Informant X	1st	40
•	2nd	30
	3rd	15
Informant Y	1st	40
	2nd	30
	3rd	22

The foregoing data suggest that the yield of a second year rice swidden is 25 + per cent less than a first year swidden. The most noticeable drop in yield occurs at the third year cropping. It is not economic to plant a swidden four years in succession at Pakak. By then, the fertility of the soil is insufficient to support a rice crop and the cogon is in almost complete control of the area. A household, therefore, needs to prepare a new swidden every four years. If suitable land is available, the new swidden is generally located near the old one. If not, it may be necessary to move to a new forest. As noted, the people at Pakak moved there because their previous habitat became unsuitable for swidden agriculture.

The Gaddang have a term, balat, meaning to recultivate an old swidden.

The concept and the practice of fallowing is of little importance in the cultivation cycle. Informants agree that land may lie fallow and then be recultivated, but in Pakak, there is only one reported case of this occurring in the last six years. Since the *cogon* tends to become the predominant secondary growth in the swidden, there is actually little fallowed land available suitable for swidden farming. It is not possible to farm *cogon*-covered terrain by swidden methods.

The purpose of this paper has been to note some of the salient characteristics of Gaddang interaction with nature, especially as affected by swidden farming in general, and rice cultivation in particular. The household is the minimal social group through which the Gaddang interact with their environment. It is responsible for its total economic welfare and the preparations, cultivation, and harvesting of its swidden. The most important Gaddang crop is rice. Its value is reflected in many features of Gaddang culture. Despite the fact that few households produce enough rice for their own consumption. informants say they will continue to grow it, preferably by swidden methods. Clearly, then, swidden cultivation is a most pertinent ligature between man and nature. But through agriculture, the Gaddang bring about an imbalance in the ecosystem. Over-cultivation of the land leads to soil infertility, erosion, and encourages the spread of co-Because of the ever diminishing gon. amount of land suitable for swidden farming, a Gaddang household must periodically move to a new forest or change its method of plant cultivation. Thus far, the people at Pakak have chosen to follow the forest. When the writer asked an informant why he persisted in taking this course, he replied very simply.

ana laman a ana yo akun. there is always cogon.