MJSIR
Mountain Journal of Science and Interdisciplinary Research
PRINT ISSN: 2619-7855
ONLINE ISSN: 2651-7744
January-June 2025 • 85 (1) : 124-139

Agriculture in Guinaang, Mountain Province, 1985-1989

Linda M. Wicks

Stony Brook University, New York
Author email address: lindawicks@optonline.net

ARTICLE INFO
Date Received: 20-28- 2024
Date Last Revised: 09-0 3, 2024
Date Accepted: 06-30-2025

KEYWORDS

Abstract

Between 1985 and 1989, the people of Guinaang, Bontoc carried out several kinds of subsistence agriculture, predominantly irrigated rice farming and dry gardening, and to a minimal extent, swidden agriculture. Their agriculture requires exhausting labor inputs by women, men and even children, and they generally consume all of what they harvest. Most of their labor was devoted to their rice ponds which were dependent on springs and river water. Their most cherished agricultural land is strictly passed from one generation to the next through inheritance, never to be bought or sold. Sufficient productivity that meets the nutritional needs of the community was dependent on numerous factors, such as both family-level and community-level organization to exploit natural resources, the fine-tuning of agriculture to the annual climatic cycle, and rituals which can provoke the good intentions of the ancestral spirits. To assess intensification of agriculture, numerous factors, among them the planting second rice crops, must be examined.

Introduction

Located in Bontoc municipality, Guinaang is in the central range of the Cordillera Central along a tributary of the Chico River known as Balitian Creek. The total land area is about 13.8 square kilometers. Its territory has one nucleated habitation area with about 1375 people (Rural Health Unit [RHU], 1980). The territory outside the habitation area includes unmanaged, communally-owned mountain with ridges and steep inclines and various kinds of agricultural land. While the mountainous area provides the people with firewood, construction materials and wild edibles, the human population dependents on agricultural fields to sustain life.

In the habitation area, there are about 350 households, each with just under four people on average. The most common household composition is the nuclear family with village-endogamous monogamy. The census data from the 1980s collected by the Department of Health shows that 32% of the population is under fifteen years of age (RHU, 1980). While this might appear to indicate imminent population growth, factors such as infant mortality and emigration limit the growth.

The climate of Guinaang is upland tropical with marked humid and dry seasonality. The Guinaang people recognize three seasons which impact heavily on their annual cycle of activities: the dry/cold season including January, February and March, the wet season between April and September that comes with Pacific monsoons, and the cool season, October to December. The annual cycle impacts the agricultural cycle as well

as sickness for both the people and their animals, and even contact with the outside world.

The Guinaang territory is well watered. Water tumbles from numerous springs, some of which flow seasonally, others perennially. The Balitian Creek flows all year around. There are three types of agricultural land:

Rice Ponds

Rice ponds (*payew*) are the most managed of all agricultural lands, the most productive and the most valued. They are inherited by individuals, passed on to the next generation and never sold. Women pass their field to their daughters or, if childless, to the sisters' daughters. Men pass their fields to their sons, or, if childless, to their brothers' sons. These fields are always bunded and irrigated. They exist wherever water sources permit irrigation. A tiny percentage of these fields are located on land which is virtually flat, but the vast majority are on slopes which require terracing with stone walls. Wet rice is grown in them during most of the year. During the off season, they are planted with sweet potatoes or grazed upon by water buffalo.

Gardens

Gardens (*bowag*) are permanent, rain dependent fields. They are commonly but not always terraced. Gardens are managed with moderate care and inherited by individuals in the same manner as rice ponds. They are considered valuable inheritances, but less so than rice ponds. Gardens are planted annually for at least four or five months with a variety of crops, including vegetables, and lie fallow the rest of the year. A few gardens are located inside the village and most of these are planted with sweet potatoes to feed pigs. In addition to the main gardening areas outside the village, gardens are found scattered among rice fields where irrigation is unavailable, including on the sloped land of collapsed rice ponds that await repair.

Swidden Fields

Swidden fields (*oma*) are managed on a temporary basis, reverting to mountain land when not in use. These fields tend to be located on moderately sloping land where farmers can contour plant rain-dependent secondary crops, mainly vegetables. Only about two percent of the Guinaang territory is dedicated to swidden fields, the land unclaimed and available to individuals.

Wealth in Guinaang emanate from the agricultural economy, chiefly rice ponds. With few exceptions, every able-bodied resident is a full-time farmer. Still, virtually all families experience periodic dietary hardships. In their economy of scarcity, the Guinaang family commonly live in the delicate balance of sharing and yet concealing what they have, surviving without long range surplus and yet privately hoarding whenever possible. Consequently, many families rely somewhat on the cash economy which reached Guinaang in the 1950s, but opportunities never accommodate all those seeking work.

Apart from a handful who find work for cash in the village, such as a few carpenters and the two transport drivers, the cash economy links to Guinaang primarily through the sale of unskilled labor. Many of the work opportunities are seasonal and require workers to house outside of the village in places like Bontoc and Baguio, and three or four residents work and live abroad. Despite the employment-related comings and goings, virtually all the Guinaang people strongly identify with the village community and feel tied to the land and the ancestors. Even those who take up residence elsewhere claim their inheritances, maintain economic ties, and participate in ritual life. Most see their absence from the village as temporary; they invest their money in village houses even if they rarely use them, and most will die and be buried in Guinaang. While some of those who live away from the village may acknowledge that their lives are easier on the outside, almost all of them feel unjustly alienated from the land by meager inheritances. If given the choice, they would subsist by farming.

The local people are keenly aware of the scarcity of rice ponds and permanent gardens. The population density, 99 people per square kilometer, appears to be the highest it has ever been. There are two solutions to the scarcity dilemma, emigration, and agricultural intensification. This brings us to the focus of this article, the description and assessment of agriculture as it was observed between 1985 and 1989.

Sufficient productivity that meets the nutritional needs of the community is dependent on both family-level and community-level cooperation. Rituals that are performed to provoke the good intentions of the ancestral spirits are not to be underestimated, as they play a vital role in reinforcing both family and community solidarity that feeds into the success of crop production. Such solidarity permits the fine-tuning of agricultural practices to the natural environment, including the annual climatic cycle. In addition to considering the social features of agriculture found in Guinaang, the full understanding of the intensification of agriculture must consider a host of factors, even the possibility of planting second rice crops, for example.

The objective of this paper is to describe Guinaang's agricultural system, with emphasis on its integration with the natural environment and the concomitant social organization that supports it.

Methodology

To achieve the objective, the author resided in Guinaang for nineteen months between June of 1985 and September of 1989. Thus, the entire annual cycle was observed. Data was collected via participant observation with numerous villagers who generously shared their knowledge and experiences. Both in the fields and in the habitation zone, the observations were made via informal conversations with many farmers too numerous to count.

Two specific Guinaang women and one man were active participants who shadowed the author, assisting with the physical aspects of the data collection, at times serving as interpreters and always helping the author establish conversations with local people. One family generously permitted the author to join in their agricultural work. This provided the author with hands-on experiences with farming techniques and opportunities to interact with numerous farmers.

Results and Discussion

Territory, Habitation, and Irrigation Systems

About one-third of the Guinaang territory was dedicated to agriculture. On average, a cultivated square kilometer feeds about 315 people. The vast percentage of the agricultural land was planted once annually, a small percentage more than once annually. Considering the small contribution of the swidden fields to food production, most of the following discussion centers around rice ponds and gardens.

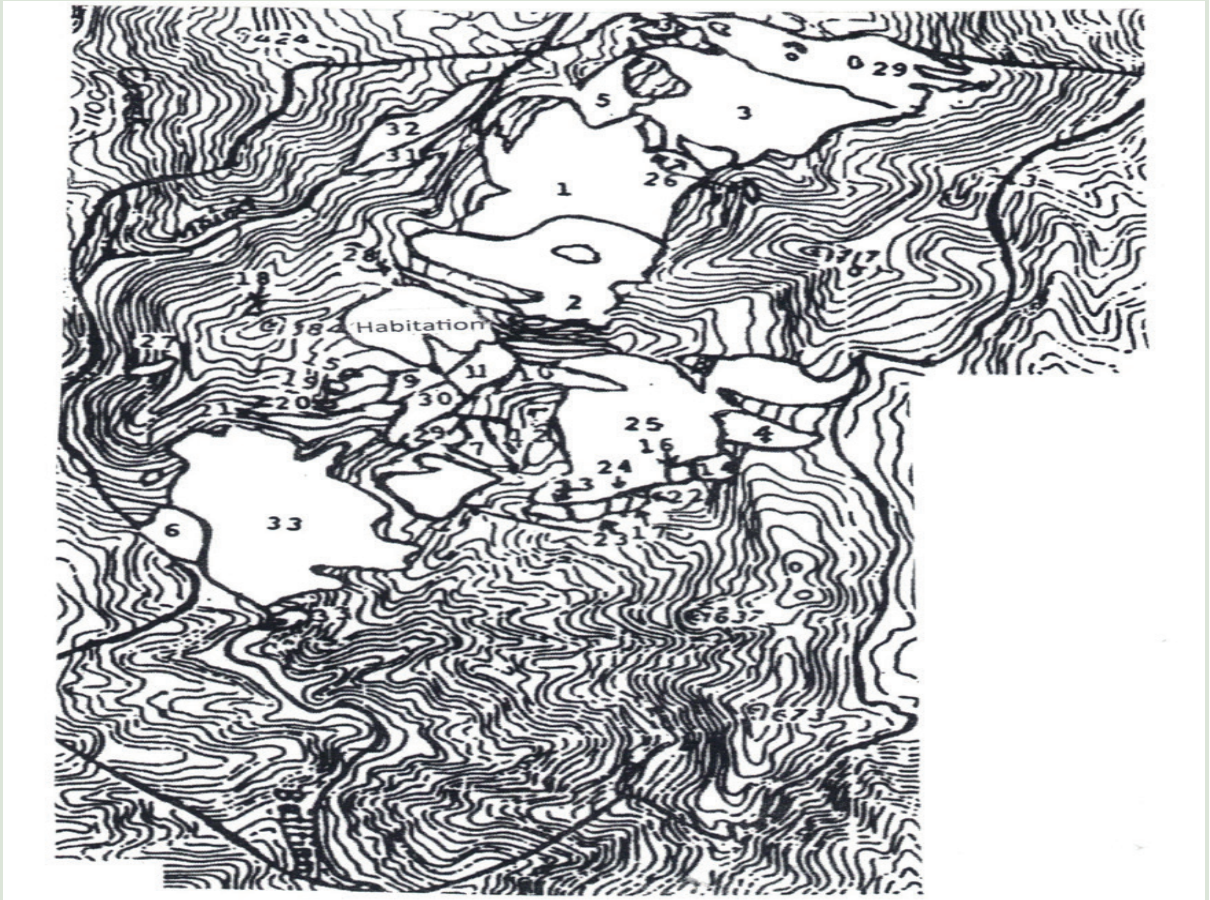
There are two kinds of permanent fields in Guinaang: rain dependent and irrigated. Whether a permanent field is terraced or not depends on the natural slope of the land, if the field is irrigated or rain dependent, the size of the field, and the use of the land at the field's borders. Since all rice ponds were irrigated, each one requires a bund and those that were constructed in areas with slopes as small as 5% require stone walls. By contrast, permanent, rain-dependent fields with slopes less than ten or fifteen degrees do not need walls, but even these may be terraced and walled when they are surrounded by other permanent fields. This means that the vast majority of the permanent fields were terraced and secured by stone walls.

All level fields, whether naturally level and artificially level, were irrigated if water is available, and irrigated fields were planted with rice most of the year. Secondary crops, such as vegetables and sweet potatoes, were confined to rain dependent fields and drained rice ponds between rice plantings. Irrigated fields constitute about 20% of the entire territory, and about 85% of the agricultural land.

Figure 1 shows that there were at least 34 separate irrigation systems in Guinaang. All of the water which was used to flood fields originated either from various springs or from the watercourse which the local people call *wangwang*. In the case of springs, water may tumble in a natural ___ before entering the first field or it may enter an upper field directly, either from above the field or at the base of the field. A system may be comprised of only one rice pond or hundreds of them. Of the 34 identified

Figure 1

Map of Guinaang: Territory, Habitation, Irrigation Systems (Source: DOH, 1980s)



irrigation systems, 28 were watered by a single spring, four by multiple springs and two by river water. As Table 1 shows, the irrigation systems vary considerably in size. The complex systems ranged from 4,950 square meters to 309,000 square meters. The variation in size was determined by the availability of water: the greater the flow, the greater the area.

In addition to these spring fed systems, there are two unique neighboring systems, *Aloy-oy* and *Daligdig*, which are spring fed but which have small canals that channel the spring water into the fields. The water for these systems flows from a spring which first feds the Wail system which is above *Aloy-oy* and *Daligdig*. After flowing through the Wail system, the water moves in a natural stream and then flows through two earthen canals to the top fields of *Daligdig* and *Aloy-oy*. These are the only two systems in the territory that utilize small canals, both being less than sixty meters long. The history of these canals needs further investigation, but it appears to be related to the construction of the sizeable canal at Wangwang, discussed below. The sizes of these small canal systems in square meters are as follows:

There are two systems that rely on the damming of Mainet Creek for their water. One receives water directly from the Creek and one that is dependent on a canal to carry the water. In these systems, water is diverted by dams of earth, rock and wood which are maintained jointly be the field owners.

The irrigation system of Wangwang is dependent on the largest canal in the Guinaang territory which waters riceponds that are decidedly valued for their high productivity. The

Table 1

Irrigation Systems in Guinaang Mt. Province, 1989

Irrigation System	Name	Size (Sq.Meters)	No. of Springs
Spring-fed Irrigation Systems	Posong (1)	261,000	1
	Ledeg (2)	192,600	1
	Liyang (3)	147,600	1
	Lokkot (4)	46,800	1
	Eb-eb (5)	46,800	1
	Yommad (6)	35,100	1
	Illang-1 (7)	30,700	1
	Lababbay (8)	27,000	1
	Gilay (9)	23,850	1
	Wail (10)	20,700	1
	Dakkit (11)	18,900	1
	Illang-2(12)	15,300	1
	Ambotog (13)	15,300	1
	Tangkollaw (14)	11,300	1
	Pantal (15)	9,000	1
	Kalangkang (16)	7,650	1
	Daweng-1 (17)	4,050	1
	Pinora (18)	1,500	1
	Akkang (19)	400	1
	Mokkong (20)	-	1
	Giwang (21)	(approx) 750	1
	Mabasa (22)	-	1
	Egwal (23)	-	1
	Dodokangan (24)	-	1
	Sokol (25)	309,600	2
	Takdangan (26)	27,500	2
	?(27)	4,950	2
	Pokkis (28)	3,600	3
Spring/Canal Systems	Aloy-oy (29)	10.35	
	Daligdig (30	27,450	
River Dam Systems	Daweng I (31)	15,300	
	Daweng II (32)	27,900	
River Canal Systems	Wangwang (33)	430,000	

Note: n.d- no data

Source: Census data from the Bontoc Office of Rural Health, Dept. of Health, mid-1980s

canal runs from the Mainet Creek along Guinaang's western border, just west of the Balitian Creek. It winds its way for about five and a half kilometers before it reaches the major expanse of fields that it waters. It then twists its way another seven kilometers above irrigated fields before winding another three or four kilometers through mostly unmanaged mountain until it reaches Guinaang's southern border.

Today, the irrigation systems seem to be undergoing very slow expansion at best. During the 1985-1989 observations, no new irrigated terraces were built, but one was constructed in 1984 and the owner has plans to expand this field after the 1986 harvest. Informants state that additional irrigated fields cannot be constructed because there are no unutilized water sources. This, of course, does not discount the expansion of terraced, rain dependent fields.

Despite the lack of notable expansion, the technology of terrace building is sharply maintained in Guinaang today. Most of the wall building that is done today serves to either repair or replace walls that were damaged by heavy rains. However, wall repair rates appear to be inexplicably low. For example, during the course of this project, some forty-one damaged terrace walls were noted after a typhoon. A full year later, 46% of them remained unrepaired. Usually, rice is planted in the intact portions of damaged fields and rain dependent vegetables are planted in those areas that slid out. The end result is a reduction of productivity. Although eager to repair the fields, the landowners claimed they could not afford to hire laborers who would have to be paid in either rice or cash.

All of the rice grown in Guinaang is grown in the irrigation systems. In 1985, the Guinaang people were dependent on a single rice harvest per year with the exception of the owners of *Wangwang* where water is abundant and the warmer temperatures augment the rapid maturation of rice crops.

Agricultural Cycle, Rice Farming Practices, and Rituals

The agricultural cycle begins by September or October when the rice ponds are plowed. Because it is easier to plow wet soil, the fields are either left inundated after the prior harvest, or are reflooded for the plowing season. Both draft and manual plowing are employed.

Draft plowing, done by men, is physically less arduous and requires about one quarter as much time as manual plowing, but only those farmers who are affluent enough to either own water buffalos (8000 pesos for an adult buffalo, 5000 pesos for an immature one) or to pay others for their labor can depend on it. Most farmers apply back-breaking human labor. To hand plow, people use a tool *(sobsob)* made by men from hard woods collected from remote hillsides or a short-handled, metal-tipped fork which is purchased in Bontoc. Although some men contribute, the bulk of the manual plowing falls on the backs of women and even children as young as six years old. Women dislike this work and say it is among the hardest of all their labors, and they are grateful when they can get help.

In addition to pulling plows, water buffalos serve other purposes in Guinaang and bring prestige to their owners. Some are bred in Guinaang, but many are imported from the Mountain Province municipality of Paracelis by a few Guinaang men who walk buffalos to Guinaang on week-long journeys to resell them for profit. Part of the explanation for the prestige may be that each animal represents a huge amount of meat among a people who feel they can never satiate their appetite for meat. Ultimately, every buffalo is eaten regardless of the cause of death or state of decay. Although water buffalos play smaller roles in rituals than chickens and pigs, they are obligatory in the *dono* wedding ceremony and their stored, salted meat supplements the fresh meat of other sacrificed animals at many rituals when large numbers of people are fed. Nonetheless, plowing is the buffalo's most obvious function.

Men do all the draft plowing. A man who is plowing with a water buffalo usually works alone. If he is working in someone else's field, he charges the owner fifty or sixty pesos for a half day's labor. Landowners are very cautious when they hire someone to plow their fields because they want someone who is conscientious, kin among the most trusted. A well- plowed field is turned over at least three times and is then harrowed with a buffalo-drawn, wooden comb. The work is seen as so strenuous for a man that he is almost always in his prime. Female buffalos are considered too weak to pull plows, but

Table 2

Rice Varieties Cultivated in Guinaang, Mt. Ptovince, 1989

Local Name	G/1000	Length/cm	Width/cm	Awn/cm
NON-GLUTINOUS				
Baslang	27	0.85	0.38	0.59
Bangowan	28	?	?	?
Basyet	32.5	0.79	0.3	0.39
Binila	32.5	0.84	0.31	0.68
Dinalik	31.5	0.7	0.3	0.1
Gingyangan	30.5	0.82	0.39	0.5
Ingtan	22	0.86	0.27	0
Initab	36.5	0.84	0.39	0.82
Linakod	30.5	0.87	0.35	0.34
Pol-o-pol	24	0.78	0.2	0
Sedlayan	29	0.81	0.3	0.56
Sapon	30.5	0.91	0.25	0
Sinyolo	31	0.87	0.32	0.71
Tinobeng	37.5	0.79	0.33	0.43
Tinokoban	31	0.87	0.3	0
GLUTINOUS				
Binitillaw	28	0.79	0.31	0.24
Boyaboy	35.5	0.89	0.44	1.17
Dayyong	30.5	0.87	0.33	0.63
Kabagtan	34.5	0.89	0.34	0.11
Kassang	17	0.81	0.3	0.91
Walay	29	0.71	0.27	0
Kinonkoney	?	?	?	?

even males are not worked for more than two consecutive days without being rested.

Despite the strong negative feelings people hold towards manual plowing, there is no clear evidence that plowing by animal is notably more efficient. Not only is the acquisition of a water buffalo an expense, but the plow itself is also an investment of time and money. Some owners make their plows from hardwood they collect, but a rig may represent a substantial financial investment. Metal tips purchased in Bontoc or Baguio and affixed to locally made wooden frames are common (Informant, 1989). A man may also opt to purchase an all-metal plow in Bontoc and Baguio for about 400 pesos. Even the rope that harnesses the animal is purchased. Furthermore, these animals are always at risk because they are kept outside the village where they cannot be diligently watched. There, they are susceptible to illness, accidents, and thievery. Furthermore, they are endangered by typhoons at least several times annually. They often graze in fields that could be used more productively. They are a constant drain on labor as they tend to be visited twice daily, moved from one grazing location to another on an already heavily utilized landscape (Informant, 1989) and prevented from damaging growing crops.

This last problem is like a plague for some landowners, as buffalos are not easily contained. The problem was community wide in 1985-1986, as many people complained about other people's animals wandering into their fields. Crop damage was so heavy that the barangay captain made a public announcement that those individuals who found a buffalo destroying their crop had the right to kill it on the spot. While no incidences led to the slaughter of an animal that year, it is widely acknowledged that the crop damage can be substantial.

In general, farmers make independent decisions about when to plow and which fields to plow, but since rice ponds require water before they can be plowed, there are times when the landowners of an irrigation system must act in unison to flood the fields before any of the fields can be plowed. In most cases, the landowners cooperate informally, but there are examples, such as at Wangwang where the plowing cannot begin until large numbers of people are publicly called upon to work cooperatively.

While plowing proceeds, women begin seedbeds for the main rice crop as early as November. The women decide both where and when to establish the beds, although the timing is publicly announced by the male elders. Beds are preferably located in fields close to the village under watchful eyes or in Wangwang, believed to be warmer. *Tabon* is a favorite location among those who own fields there. A seed bed may cover an entire field, or a portion of a field may be mounded off for the bed. The most important consideration in locating a bed is the availability of water because sprouting occurs during a time of limited rainfall.

The establishment of a seed bed is a very simple process. Once the field has been plowed, the woman may trample it to smooth out the soil below the water and bury clumps of vegetation. She then casts the seeds, returning to the bed to check the sufficiency of the water.

The most complex task of this part of the agricultural year is the selection of seeds. Women make this important decision, matching the rice varieties with best suited fields. There are two basic kinds of rice in Guinaang, glutinous (*dayket*) and non-glutinous (*poddaw*), and everyone wants access to both kinds. Non-glutinous rice is common table rice and it is raised in larger quantities than glutinous rice. Still, glutinous rice is highly valued. When fermented, it produces wine for ritual purposes and for the daily enjoyment of men. It is particularly important in the hosting of male visitors who drop by either private houses or one of the men's houses. When it is in its early stages of fermentation, the women and children enjoy snacking on its sweetness. Glutinous rice also has a role in the ritual life of Guinaang, such as during ag-agom, the harvest celebration, when it is cooked in sugarcane leaves and eaten by the extended, bilateral family at an evening meal.

Each of these two basic types of rice comprise a large number of varieties planted by the Guinaang people. Below is a list of varieties collected during 1985-86. In all cases, the glumes were first dried. Then, 1000 glumes were weighed in grams (G/1000). The average length (Length) and width (Width) was measured for a random sample of 100 glumes per variety. The average awn length (Awn) is based on the measurement of 100 random samples per variety. Perhaps incomplete, this list includes both the common and uncommon varieties.

It is clear that new varieties are introduced from time to time, while some varieties fall into disuse and are permanently lost. For example, a forty- year- old informant recalls two varieties of glutinous rice, now vanished: *Ginolong* which was very yellow when ripe and had short awns, and *ginonloney*, similar to today's red dayyong but with tan stripes. Informants claim that both have been replaced by *walay*, preferred because of higher yields, greater resilience to drought and the durability of the stickiness after cooked. Informants were also able to recall two kinds of non-glutinous rice which have fallen into disuse, *tappi* for one. *Bangowan* appears to be a risk, with one farmer holding on to a small amount.

When a woman selects varieties for her seedbeds, she considers many factors. She notes each variety's reputation regarding yields, resistance to disease and pests, draught, flooding and heavy winds. She must consider the microenvironments of each of her fields. She may place value on a variety's likelihood to remain whole during pounding or to remain on the panicles if it is stored before it is completely dry. She decides how much glutinous rice her household will need for rituals and rice wine compared to how much table rice will be needed

for the year. She will also take into account her family's taste preferences for the different varieties.

By December, the planting season begins, first in the colder fields with their longer growing seasons. Drier fields are also planted early so that the roots can get established before the worst of the dry season sets in. Certain fields in Matteng are always first. Planted last are the warmer fields with dependable water, such as the fields in Wangwang and Yommad.

Planting is exclusively the work of women. To plant her fields, a woman may work alone, in cooperation with close female kin, or she may enlist an all-female, cooperative labor group which she voluntarily joins. With long and abundant workdays, the planting season is a very difficult time for women. For hours at a time, women stand with bent backs in bone-chilling water. Many women depend on older women or men in their families who have finished plowing to attend to domestic work, such as cooking and childcare.

To begin planting their fields, the women first pull and bundle the seedlings early in the morning when it is still cool. Then they carry them to the fields in which they will be planted. These young plants are considered fragile. They are always kept in water or covered with damp grasses to prevent dehydration, and they are rarely left unplanted overnight.

Once the actual planting begins, a worker takes a bundle of seedlings to the edge of the field, and anchors the roots of the seedling into the mud, seeing to it that the top of the plant is above the water's level. The seedlings are planted somewhere between about six and fifteen centimeters apart from one another. Generally, each field is planted with a single rice variety.

In March or April, the end of the planting season is marked by a ritual known as *apoy*, which means fire. Its name comes from the fire that is ritually carried from each house to every field the household owns. The fire is used to cook meat for the ancestors so that they will protect the growing plants and ensure a good harvest. Old men announce the beginning of *Apoy*. The ritual lasts at least four days, and it has great social significance in that it reinforces both community and family. On the third night, extended families gather to ritually share a meal. This is the one time of the year when the Guinaang people who reside outside the village make every effort to return home.

After the fields have been planted, farmers must maintain adequate amounts of water in their fields. For the farmer, this part of the annual agricultural cycle demands a watchful eye kept over widely dispersed fields and cooperation with many field neighbors. Fields located below reliable springs, such as at Ladeg and Posong, or irrigated by river water, such as at Wangwang, are favorably located. Their owners may need to visit them every two or three days to adjust the water levels, but they are relatively worry free. Many fields are located in areas, such as Bagew, where water must be cautiously shared. In these cases, most farmers experience anxious moments anticipating the onset of the rainy season in March.

When water is scarce, the *pomayew* comes into play. The pomayew is an informal group comprised of all the land owners of an irrigation system. The pomayew members gather in the fields to agree on a watering schedule. Once the agreement is put into effect, each farmer must act defensively to assure that the agreement is respected. Many farmers opt to sleep in the fields to vigilantly guard their water rights. In some cases, the members of the *pomayew* will agree to sleep in the fields together, protecting the rights of those who are present, and perhaps helping themselves to the water of those who are absent.

Although water stealing rarely occurs among relatives, it is a common occurrence. The severity of the sanctions against water stealing vary in accord with the severity of the resultant damages. In the case of minor infractions, the victim may place sticks in an upright position around the area where the water was diverted so that the thief knows he or she has been identified. In such cases, to protect their otherwise cooperative relationship, the people involved in the conflict will not confront each other directly. In more severe cases, the group may implement an agreement to act against an accused person by levying a fine or restricting the person's water rights, and even denying all water rights for an entire year.

Once the rains begin, water shortage is no longer a problem, and the fields are thereafter rainfed. By April the water shortage has usually

dissipated, but in bad years, the rains come in May. By this time, there is crop damage. The most vulnerable fields are those located farthest from the water source. These fields will be allowed to wither and die while the upper fields will be allocated all of what little water there is. To intervene, the members of one of the men's houses will go off to the mountains to ask the ancestors for rain. If they are fortunate enough to hear an auspicious bird call, they will return to the village, rhythmically beating on wooden shields used earlier this century during raids. This publicly announces the impending rains to everyone. The omen seekers return to the men's house to sacrifice a chicken, dog or pig, depending on what they can afford, and they eat together. If they fail to hear the bird call, they must try again the following day.

Once the heavy rains come, new difficulties emerge. Damage from heavy monsoonal rains can usually be ameliorated by the diversion of excess water from the fields, but the typhonal heavy rains and strong winds can be overwhelming. To ward off typhoons, the old men sacrifice animals at a sacred tree called *papatayan*.

Nonetheless, almost annually, at least one typhoon rips through Guinaang just prior to harvest time when the rice plants, now bowing from the weight of their golden, nearly ripe glumes, are very vulnerable to high winds and lashing rains. At worst, whole fields tumble down hillsides as stone walls give way under the excessive weight of the water in the fields. In most of these cases, the loss is not only of the field that slid out but also in the buried, lower field. No one is held responsible, and the owner of the lower field is not compensated by the owner of the upper field. Usually, the owner of the upper field is responsible for repairing the wall. If the repair is delayed, both fields are reduced in size and owner of the lower field may resort to planting vegetables in the lower field.

Not only do typhoons threaten just as the rice approaches maturity, but rodents, birds and insects take their share. Some of this is controlled by clearing grasses off the terrace walls to discourage nesting. Bird and rat traps are set by the men. At times, the Department of Agriculture in Bontoc distributes limited quantities of rat poison which the Guinaang people mix with rice husks, tuck into old tin cans wrapped in banana leaves and put in the fields. Scarecrows are erected. Some are ominous human-like figures, and some, driven by wind and water, make frightening motions and noises. Both adults and children become stone-throwing scarecrows, standing watch for long hours over many days preceding the harvest.

The most common predatory insect is the army worm which eats the leaves of the rice plant. These edible insects are picked off by hand, and roasted or fried for the evening meal. Collecting insects is the work of woman and children. In the fields, they stand showing off how many insects they collected, and they look forward to their evening meal, but everyone knows that the gains will not compensate for loss of rice. During years when the infestation is particularly bad, the old men will declare several days of ritual rest and will sacrifice animals at the men's houses. Modern insecticides are not applied.

The most common disease is leaf blight (*lekib*). This causes the leaves to turn brown either before or after the rice plants flower. Usually the plants survive, but they will not produce seeds. The only remedy for leaf blight is a ritual which sends representative of a men's house to the mountain to listen for good bird calls before they sacrifice an animal at the men's house and eat together.

The harvest season encompasses June and July and stretches on into August if the monsoonal rains began late. To initiate the season, a three-day resting ritual, teer, is proclaimed by a village elder who acts on the consensus of the people. Teer serves to solicit the good will of the ancestral spirits on behalf of a bountiful harvest. When rainbows appear on these days, the teer is extended by a day since a rainbow indicates the presence of malicious spirits which endanger the harvest. During teer, visitors may not enter the village and each Guinaang resident rests within the confines of the village. These days are spent attending to household chores such as pounding rice, and people are expected to make themselves available for social visits and meetings. When these days of ritual are concluded, people are free to harvest any of their fields except those in Bagew.

The Bagew fields require their own three days of teer, but since these fields are among the last to reach maturity, the ritual for Bagew is celebrated towards the end of the harvest season.

No one in Guinaang can explain why the Bagew fields require their own teer. These fields are particularly desirable because they are located on an unusually large, flat expanse. It may be that they warrant special treatment because they are the oldest fields, but this is mere speculation.

Men and women work cooperatively when harvesting a field. The women are largely responsible for cutting the stalks of the ripened rice and binding them with thin strips of bamboo into handful-sized bundles. Each stalk is cut individually about six or eight inches below the grain with the use a small knife specifically designed for harvesting rice. A bundle serves as a standard measurement and is used, for example, to pay day laborers, fines, and contributions.

The men spend their time transporting the bundled rice from the field to the rice granaries and the houses. Between hauls, they help the women cut. To carry their loads, the men use shoulder baskets which consist of two baskets bound to each end of a carrying bar. Each load contains about fifty rice bundles. The work is considered arduous, strong men are greatly admired, and the women are especially grateful for their efforts. A woman without the help of a man is hard pressed. She will hire labor if she can, or she will carry her own harvest in a head basket, making many trips back and forth. Boys as young as seven contribute to this work by carrying eight or ten bundles draped over poles that are balanced across their shoulders. Old men will also carry small quantities in this fashion.

The harvest season is both joyful and grueling. Especially when the harvest is a good one, everyone enjoys a renewed sense of optimism and security. People are relieved to know the time of scarcity is over, and they are eager to taste the newly harvested rice which is more delectable than old rice. Everyone, especially the children, take delight in nibbling on roasted immature rice, which is eaten as a confectionery. So special is this treat that it warrants a special kind of small woven basket with a restricted neck that can be plugged.

On the darker side of the harvest season, people are over-worked and stressed to their capacity. Education is interrupted as school children are kept home to help. The work proceeds from sunrise to sunset, rain, or shine, with little respite. For weeks, the excessive heat of the day culminates in chilling rains which are stoically endured. Interspersed are days of around-the-clock torrential rains brought on by lingering climatic depression including typhoons. During this period, diseases are on the rise, particularly respiratory infections, and dysentery. During the long hours of parental absence, infants and young children are jeopardized, and mortality rates peak. By the time the Bagew teer is proclaimed, everyone is exhausted and in need of the three teer days of inactivity to rest up for the remaining two or three weeks of the harvest season.

Perhaps reflecting the anxiety that is associated with the harvest, during this season the Guinaang people have a heightened awareness of the supernatural world in their daily lives. This awareness is expressed in ritual. For example, the eating of food in a field that is being harvested secures the abundance of the harvest. Strangers may not approach the field nor enter the house of those gone to harvest until after a meal has been eaten in the field. Those leaving home commonly stand a stick outside their house to announce that they are harvesting. Even if a family member has remained behind inside the house, people seeing this sign will not enter the house until late morning when the harvesters have probably eaten.

In anticipation of the meal, cooked rice, uncooked pork, vegetables, and a cooking pot must be carried to each field undergoing harvest. Upon arriving, a man, or in his absence, a woman, starts a small cooking fire for vegetables. The smoke from the fire informs others that the harvesters have not eaten yet and warns that no one is to pass by. Those who might pass by are endangered, especially if they should ever eat the rice from that field. Even after the meal is taken, people carrying wood may not pass by the field. Those who do must trick the ancestors into believing they, too, are harvesters. They do this by cutting a few bundles before moving on with their wood.

Once the bundles of rice have been carried away from the rice pond, they are spread out on the ground for two or three sunny days so they dry thoroughly. This work is usually done around the houses or near the granaries by both men and women, assisted by children. It is easy work and is suitable for aged people. Once dry, the rice is ready for long term storage. Although most families consume all their rice each year, the

Guinaang people say that the rice can be stored indefinitely, commonly between ten to twenty years. Those who can afford to, store rice in anticipation of certain wedding ceremonies and for improbable famines caused by warfare or natural disasters. Whether or not the nutritional value of the rice is depleted by long term storage is not an issue among the Guinaang people, but they are aware that long term storage adversely changes the taste of the rice.

The end of the harvest season is marked with a celebration known as ag-agom for which each household hosts its bilaterally extended family for an evening meal. The ritual centers around the sacrificing of a chicken which is prayed over by a senior male to thank the ancestors for the harvest. The chicken meat can be supplemented by pig or water buffalo but never dog. Rice wine and glutinous rice cooked in sugar cane leaves are served, usually along with non-glutinous rice and dried beans. *Ag-agom* is initiated by an old man who is designated to lead so that others may follow. Once the ritual is carried out in the home of one extended family member, each of the other members will begin preparations for the ritual in his/her own house. The ritual season lasts about a month.

After the dried rice is either stored in granaries or in houses, it is taken as needed. The preparation of the rice for cooking is usually done by women. First the grains must be removed from the dried stems. Usually, stems are laid against the ground or another hard surface and the rice is scraped off the stem with the use of a handheld implement that has a hard, flat surface such as rock or a coconut shell. The rice seeds are placed in a stone or wooden mortar and are pounded with a heavy wooden pestle until the grains are freed from their husks. The rice is usually winnowed several times, ensuring that all the grains are separated from their husks. This is women's work, and it is physically demanding. Now the rice is ready for washing and cooking, and the husks can be used as fertilizer or pig feed. Both men and women cook. Today, the rice is steamed in a metal pot over an open fire inside the house. In the past, clay pots were used.

The data on yields are far too preliminary to generate definitive statements. Only twelve observations were made in nine fields (Table 3).

In a sample of 40 bundles, the average bundle produced 0.36 kilos of pounded, uncooked rice. At this rate, a hectare of land produces 1400 kilos. This compares only slightly below the average world-wide yields of 1,550 at latitudes similar to Guinaang (Grist, 1975). Owner Dong-ayo stated that yields were reduced by pests, but added that there are low yields periodically without explanation.

Table 3

Observed Rice Yields in Bundles/sqm, Guinaang

Owner	Size/Sq.Meters	Bundles	Bundles/Sq.Meter	Date
Way-ya	606	220	0.36	Jul 1986
Tommo	485	320	0.66	Jul 1986
Walking	680	340	0.5	Jul 1986
Dong-ayo	355	86	0.24	Jul 1986
Dong-ayo	355	86	0.39	Jul 1989
Bonak	474	220	0.46	Jul 1986
Isso	889	310	0.35	Jul 1986
Dong-ayo	156	52	0.33	Jul 1985
Dong-ayo	156	68	0.44	Dec 1985
Dong-ayo	221	91	0.41	Jul 1985
Dong-ayo	221	40	0.81	Aug 1989

Roots and Tubers, Pulses, Cereal and Other Crop Production

In addition to rice, the Guinaang people raise both vegetables and fruit. Vegetables are the domain of women, and they carry out all the work independent of men. Vegetables are planted early in the wet season when the labor demands of rice ebb (Table 4).

People complain that there is a perennial shortage of vegetables, both in quantity and variety. Consequently, the planting of vegetables is always met with eagerness and optimism. Most women in Guinaang have access to a small, permanent gardens through their own inheritances or their spouses. Many permanent fields are located above the main irrigation canal in Wangwang and in areas just south and southwest of the settlement. Below, see crops planted in gardens. Many of these crops are consumed immediately upon harvest, and are not part of the Guinaang diet for more than two months of the year. Stored for long periods of time, beans are dietarily important as a major source of protein. Cassava, best during April and May, and sweet potato, accessible December through May, fill in if rice is in short supply.

A woman usually depends on rain to soften the garden soil before she begins to prepare it for planting. To plow a vegetable garden, she uses the same tools she uses when hand plowing a rice pond. After an eight month follow, a vegetable garden is usually overgrown with weeds that are turned into the soil and allowed to decompose before the soil is reworked and planted. Some women also fertilize gardens with collected vegetation. Ambitious woman who are concerned about low productivity carry pig dung from the village to fertilize their gardens

A typical vegetable garden is intercropped with at least two crops. With the exceptions of roots and tubers, most vegetables are propagated by seed. A woman plants the seeds she saved from her last year's crops although she can ask for seeds from other women if she falls short. Seeds are planted with dibble sticks in a non-geometric formation. Very little labor is put into a vegetable garden after it is planted. The fields are usually weeded only once or twice.

The harvesting is done by the woman who planted the field or by older children. It is common for a woman to gather only enough from her garden to satisfy the family needs for several days unless she is harvesting beans which will be dried and stored.

Table 4

Common Garden Crops and Origins, Guinaang, Mt. Province, 1989

Common Garden Crops	Origins
Roots and Tubers	
Taro	Old World
Sweet Potato	Old World
Cassava	New World
Yams	Old World
Pulses	
Lima Bean	New World
Common Bean	New World
Kidney Bean	New World
Peanuts	Old World
Pidgeon Bean	Old World
Hyacinth Bean	Old World
Jack Bean	Old World
Black Bean	Old World
Cereal	
Foxtail Millet	Old World
Vegetables	
Corn	New World
Squash	New World
Chayote	New World

Unlike vegetables, fruits play a minor role in the Guinaang diet, usually eaten as a treat or snack. The planter of the fruit is considered the owner, especially if it is planted on land she inherited. Banana is planted both inside and outside the village with the expectation that it will provide a substantial amount of food compared to other kinds of fruit. In the village, people plant bananas near their houses or at the edges of sweet potato patches. Outside the village, they may be planted in swidden patches, particularly in grassy areas at the edges of permanent fields. Bananas can be traded for cash or other produce, and their leaves and

stalks can be fed to pigs. In 1985-86, they sold for four or five to the peso. With only weak sanctions against picking someone else's bananas, by-passers, notably children, are known to help themselves irrespective of who they belong to.

Guava, avocado and mango trees, and pineapple are scantly found inside and outside the habitation area. Papaya trees and several varieties of citron grow in the village. Now numbering about fifteen, the first papaya trees became productive in the 1970s. They are family-owned, planted in house plots, carefully guarded, and harvested by their owners. In 1985, a medium-sized papaya could be sold for a peso.

Between June of 1985 and August of 1989, several noteworthy changes took place in food production. Foremost was the increase in second rice second cropping. In 1985 when this research began, almost all the second cropping took place in Wangwang, informants claiming they do not plant second crops even in fields with adequate water because the fields are too cold or are essential for grazing water buffalos. Only in 1986 did some farmers, experimenting with a second crop, began to overlook these issues in fields in Bagew, Matteng, Poweg, Wail and Gilay. The catalyst for this was low productivity caused by pests that year. The village captain was the first to replant his fields, and he persuaded some other farmers to follow suite. Encouraged by the success of the second crop, farmers planted an even larger second crop in 1987. During 1988 and 1989, rains came late, delaying the harvests and discouraging second cropping except in warm Wangwang, but farmers remain hopeful for future years.

While second cropping has great potential, it is still not the norm. Nonetheless, in 1985, the Guinaang people learned that second crops can be grown in some of the fields in the middle altitudes of their territory, and one wonders why two plantings per year has not been standardized, especially with the faster growing new varieties which the Guinaang people now have access to. Strong taste preferences for the slow growing strains are part of the explanation. Commonly, farmers throughout Asia readily accept the faster growing varieties as cash crops, while planting the slower growing, more delectable varieties for domestic consumption. Another explanation to consider is the all-embracing labor demands of the first crop which seem to seriously restrict the labor potential for a second crop. By the time the first harvest is in, field workers are exhausted, rains have brought increased health problems, infants and toddlers are suffering from the absence of their parents' attention, and other tasks, such as wood gathering and house building, are next on the agenda.

A second observed change was the construction of a rice mill which eased the labor of women by mechanically removing the grain from the shaft and then removing the glumes. This mill is the second of its kind in Guinaang. The first was profitably operated between 1975 and 1980 by a man who abandoned it, presumably due to chronic mechanical problems. When the new mill opened in May of 1989, it had an eager clientele. Initiated by two Dalican men and a Guinaang men, they charged ten pesos to mill enough rice to fill a five gallon can, or about twenty-five bundles of rice that might feed a typical household for about a week and save about two and a half hours of labor. However, given the cost, many of the families are still pounding rice by hand. Nonetheless, there seems to be enough business to support another mill, rumored to open in a few months.

A third change increases the protein resources through the introduction of tilapia into the environment. Two efforts have occurred, one which failed and one which is succeeding. Both were initiated in 1987 with talapia stock that was given by the Department of Agriculture in Bontoc. In one case, the village captain, who was known for his economic prowess and innovative spirit, built a small set of earthen fishponds for talapia outside the settlement area. Within a couple of years, the project went afoul. Informants believe that children managed to steal all the stock. Ironically, the same behavior had a positive effect on an Ey-eb rice pond.

Here, a Guinaang man employed full time by the Bontoc office of The Department of Agriculture stocked his field with 25 talapias. He was quite disheartened when all of them disappeared, but by 1989, much to his astonishment, harvesters in the fields above his field witnessed the fish swimming about, perhaps dispersed by children. Children took delight in catching talapia for the evening meal. The likelihood of these fish spreading throughout the perennially wet rice ponds is excellent, and their impact on the Guinaang diet should be observed as time passes.

There is no doubt that the Guinaang people feel a land shortage. Repeatedly, they state they have food shortages because of the shorted of land. They also feel that the reason so many go elsewhere to work and live is because there is not enough land to provide a livelihood for everyone. There is even some evidence that Guinaang is harder put for agricultural lands than its neighboring communities. At least 19 Guinaang people, 16 of whom are males, reside in nearby Malekong, Dalikon, Samoki, Bontoc and Tocucan, whereas only four outsiders, three of them woman, have permanently immigrated from other upland communities.

Guinaang's Agricultural Intensification

One obvious solution to the land shortage is intensifying the agricultural system. Let us now focus on numerous factors related to Guinaang's agricultural intensification. To begin, the proportion of uncleared land is certainly an important factor in assessing agricultural intensity, and we must acknowledge that two-thirds of the territory is uncleared, albeit for valid seasons. For one, valuable forest resources such as firewood and building materials would be reduced. For another, the conversion of the uncleared land to arable land would require a great deal of energy in that the terrain is very steep and the soils are very thin. Terracing would be necessary to prevent the erosion of the top soils that would most likely have to be imported. None of today's uncleared forest contains spring water, and so the result would be dry farming and its associated low productivity.

On the other hand, most of the territory that is cleared is intensely farmed thanks to the permanent modifications of the natural environment. The modifications include the stone-walled terracing of sloping land and the use of many springs, river water and even some human-made canals that irrigate most of the fields. In general, the farmed areas are well maintained, although it has been noted that the restoration of fallen walls can be untimely and that garden crop have been observed to be weed infested during the growing season.

If agriculture is highly intense, privately owned land is both bought and sold, but in Guinaang, rice ponds and gardens are acquired only through inheritance. While it is true that both rice ponds and gardens are never fallowed for an entire year or more, over 90 per cent of the rice ponds yield only one rice harvest annually. If farmers were open to new varies of rice, two crops a year would be feasible in many of the fields.

If agriculture is intense, staple and subsidiary crops are dichotomized, and we do see this. For rice, much human energy is expended, even some draft plowing, while less human energy is devoted to secondary crops and no draft plowing. For rice, men and women contribute labor. Labor is organized at the family or household level and at more complex levels including cooperative work groups (Reid, 1972). The labor of people who share water for rice ponds is also organized and sanctions may be applied to those who renege their responsibilities. For secondary crops, only women labor, and there are no formal sanctions. Community-wide rituals mark the various stages rice production, but rituals are irrelevant to garden crops. Rice is always unicropped in irrigated, permanently modified, terraced fields. Special structures are erected for long term storage. For garden crops, land may be permanently modified, but terracing in not universal and multicropping predominates, except for sweet potatoes. Consumption is immediate except for dried beans. Unlike garden plants, rice plants are closely spaced and arranged geometrically.

If agriculture is intense, labor is complexly organized. In today's world, this means land owners verses hired laborers, with the owners in control and pocketing greater benefits than the laborers. In Guinaang, labor arrangements are reflective of economic equality and primarily based on reciprocity. Very rarely are workers paid in rice or cash. Never are they hired full-time, nor brought in from outside the community. Essentially, the outright exploitation of laborers is unheard of.

In general, agricultural methods in Guinaang are simple. All farmers apply organic fertilization, such as weeds, crop rubble and collected vegetation, but chemical fertilizer is unavailable. The tool kit is very basic. Advanced mechanical implements are absent. Hauling, both to and from the fields, is via human energy. Lacking advanced controls, predators such as insects, rodents and birds are simply picked off, chased off, scared off or trapped. The ancestors are ritually summoned to destroy diseases and pests. Scientific methods are not employed. Crops are at high risk. Yields are modest. Cash cropping is nonexistent.

Conclusions

Most of Guinaang's food is grown in irrigated rice fields, but vegetables are grown in dry gardens and swidden fields. The agricultural system exhibits many characteristics of intensive farming, such as terracing and irrigation, but there are prevailing limitations to the intensity such as the employment of only local, unsalaried labor, the absence of both cash cropping and modern scientific methods. Typically, nuclear families consume all of what they produce. Within the nuclear family, both men and women make highly significant contributions to the success of the farming system, but with separate, gender-based complimentary roles. Community cooperation is critically important to the sharing of water that supports wet rice production even though the fields are inherited by individuals and are cared for by and directly beneficial to nuclear families. The social lives of the people include many rituals that bind together both family life and the community as a whole, while assuring people that agricultural production will remain sturdy. The natural resources, especially water and land for agricultural fields, are highly valued, and their scarcity places limits on population size.

References

Grist, D. (1975). *Rice*, 5th Edition. Manila: Tejano Publishing Corporation(n.d.).

Reid, M. (1972). Miss Hazel Kyrk, in M. Dye (ed), History of the Department of HomeEconomics, University of Chicago, University of Chicago Alumni Association, Chicago, IL,184–6.

Rural Health Unit. (1980). Rural Health Data of Bontoc, Mt. Province. Bontoc, Mt. Province: Department of Health.