

BIBLIOGRAPHY

CAMFILI, CHARLOTTE A. APRIL 2006. Modifications in Agroforestry Practices of Farmers in Guina-ang, Bontoc, Mountain Province. Benguet State University, La Trinidad, Benguet.

Adviser: Christopher P. Deponio

ABSTRACT

The study was conducted in Guina-ang, Bontoc, Mountain Province from August to September 2005. The study was conducted to describe the changes in the traditional Agroforestry farming practices of farmers in Guina-ang, Bontoc, Mountain Province and to identify the reasons why farmers modified their farming practices.

The study used qualitative research; where in therefore, the researcher interviewed 60 key respondents with the use of pre-structured questionnaire. In addition, actual observations and gathering of secondary information from the local government unit were done.

Result of the study showed that the traditional Agroforestry practices of the farmers in Guina-ang Mountain Province underwent change due to education and use of modern agricultural practices such as application of inorganic fertilizer and introduction of new crop varieties. Moreover, it is interesting to note that Christianity made a direct impact on their farming practices particularly in the observance of farm rituals. The farmers said that, even though we are converted into Christian, farm rituals should be perform in a practical way because it strengthens unity, love, respect, and respect.

TABLE OF CONTENTS

	Page
Bibliography	i
Abstract	i
Table of Contents	ii
INTRODUCTION	
Rationale.....	1
Statement of the Problem	2
Importance of the Study	2
Objectives of the Study	3
Scope and Limitation	3
REVIEW OF LITERATURE	4
METHODOLOGY	
Locale and Time of the Study.....	8
Respondents of the Study.....	8
Data Collection	11
Data Gathered	11
Data Analysis	11
RESULTS AND DISCUSSION	
Profile of the Respondents	13
Farm Information	17
Farming System and Practices	19

Modifications in Farming Practices	25
Problems	27
Factors that Contributed to the Changes of Farming practices	28
Possible Solutions	31
SUMMARY, CONCLUSION, AND RECOMMENDATIONS	
Summary	32
Conclusion	33
Recommendations	33
LITERATURE CITED.....	34



INTRODUCTION

Indigenous Agroforestry practices are until now observed in most of the villages in the Cordillera. There is, however, a varying degree of persistence and disintegration such that in some areas, they are on the verge of getting lost. Barangay Guina-ang in Bontoc, Mountain Province is rich in Agroforestry practices. Like in Ifugao, they also practice the “payoh” “pinugo” system which has been in existence since time immemorial. The “payoh” in Ifugao is called “payew” in Guina-ang and “pinugo” is called “fatangan” (woodlot). Farmers believe that “fatang” provides irrigation to their rice fields.

The other agroforestry farming practices in Guina-ang are swidden farming and home/ backyard gardening. The swidden farm or “uma” is an important source of food for the farmers so they attend to this regularly. Farmers abandon it only when yields are drastically reduced.

However, due to the increasing household needs, such as clothing, education and many others, some farmers prefer to go out in search of work where they are immediately paid. Other farmers prefer to produce cash crops wherein they use commercial fertilizers and pesticides within the agroforestry systems, which help them to grow food within a short time. The above circumstances are some of the factors that changed the practices of Agroforestry in the rural communities. Such situation prompted the researcher to conduct a study about the present situation of agroforestry practices in Guina-ang, Bontoc, Mountain Province.

Guina-ang is rich in traditional Agroforestry practices. With the changes in these practices however, the researcher believes that it is relevant to review such practices and



be able to come up with recommendations that might be helpful to the farmers in sustaining their Agroforestry practices.

Statement of the Problem

This study attempted to find out the reasons why the farmers in Guina-ang, Bontoc, Mountain Province are modifying their Agroforestry practices. Specifically, it tried to answer the following questions:

1. What are the traditional Agroforestry practices of farmers in Guina-ang, Bontoc, Mountain Province?
2. Why do the farmers in the locality modify their agroforestry practices?
3. What are the impacts of modifying the Agroforestry practices?
4. What possible solutions to problem can be recommended to the farmers who are modifying their agroforestry system?

Importance of the Study

This study will serve as a benchmark data on the traditional Agroforestry farming practices in Guina-ang, Bontoc, Mountain Province and so with the modifications that were introduced. It will also serve as a reference for Agroforestry students, researchers and even government and non-government institutions for various purposes. Furthermore the result of this research will help educate the farmers so they will understand the true meaning and impacts of their Agroforestry practices.



Objectives of the Study

This study generally aimed to describe the traditional agroforestry farming practices of farmers in Guina-ang, Bontoc, Mountain Province.

Specifically it aimed to:

- a) Describe the traditional Agroforestry farming practices in Guina-ang, Bontoc, Mountain Province;
- b) Identify the reasons/ problems behind the modification of Agroforestry practices;
- c) Recommend possible solutions to problems that cause farmers to modify their agroforestry farming practices.

Scope and Limitations of the Study

The study was conducted in six sitios Guina-ang, Bontoc, Mountain Province from August to September 2005. In this short span of time, the researcher was not able to take photograph of the whole agricultural cycle and also the rituals conducted in relation to farming practices.

Primary data was gathered from key informants and respondents who are practitioners of agroforestry. Additional data was also based from personal observations of the researcher as a member of the community. Secondary data related to the study was obtained from previous researches by some individual experts and also from the available data of the Barangay.



REVIEW OF RELATED LITERATURE

Philippine Council for Agriculture and Resources Research and Development (PCARRD,1991) defined Agroforestry as a land use system whereby agricultural crops, forest trees and/or livestock/animals are deliberately raised on the same unit of land either sequentially or simultaneously and applies practices which are economically viable, technologically feasible, ecologically sustainable and compatible with the cultural patterns of local population. Agroforestry, as mentioned in the Encyclopedia of Agricultural Science (1994), normally involves two or more species of plants at least one of which is woody perennials; two or more outputs; a production cycle of more than one year; and both ecology and economics that are more complex than a monocropping system. It is emphasizing that all Agroforestry systems are characterized by three basic sets of attributes, namely; productivity (production of preferred commodities as well as productivity of land resources), sustainability (conservation of production potential of the resource base) and adoptability (acceptance of the practice by the farming community). This implies that the merits of Agroforestry systems are not only assessed in terms of the production but also based on the extent to which the resource base is sustained and the local land users adopt the practice.

Steppler, and Nair (1987) said that Agroforestry, compared to other land use system primarily monoculture systems, maintains or increases site productivity through nutrient recycling and soil protection, at low capital and labor cost and increases the value of output on a given area of land through spatial and temporal cropping of tree and other species.



Indigenous Agroforestry systems are used here to refer to those systems practiced mainly by cultural minorities, which have been developed over many generations.

Cordillera Peoples Alliance (CPA, 2002) said that the “uma” or swidden farming is an old practice among the indigenous people of the Cordillera, Northern, Philippines. As early as 1500s, missionaries and Spanish Colonialist have recorded its practice not only in the Cordillera, but also throughout the Philippines. This farming practice is integral to the ecological conditions of the mountain terrain and the socio-cultural life of the people.

Agroforestry practice of the Ifugaos is one of the examples, wherein the irrigated rice terraces were constructed on very steep mountainsides. Without using synthetic fertilizers or pesticides, yields are much higher than the high yielding varieties of rice. PCARRD (1986) added that Ifugaos have been practicing “muyong” for some centuries, the local term for family forest which combines the under planting of annual and perennial crops in secondary forest. A family maintains a “muyong” which is usually located in the headwater streams that provide irrigation to their lowland rice fields.

According to Brett (1997), the swidden gardens of the Bontoc people, which are located on steep mountain slopes, are terraced with available rock or with fallen logs placed horizontally to prevent soil run-off during heavy rainstorms. These swidden gardens are consistently planted to a variety of root crops, legumes, fruits (banana) and some vegetables.

The technique of terracing and building retaining stonewalls for rice agriculture has largely prevented soil erosion, despite the cultivation in slope areas. This practice has helped conserve soil for generation of intensive agricultural activity. A balanced water



intake is maintained to avoid any over flooding of rice field during a heavy downpour. In addition, majority of the farmers drain their pond field on the second cropping so they can plant sweet potato. This cropping pattern has been observed by farmers to also increase the fertility to the pond field soil, which in preparation for the sweet potato crop is turned over and piled high for aeration.

Traditionally, farming practices of the indigenous people, as mentioned above, focuses on maintaining and enhancing the quality of the environment and conserving natural resources. This is observed in the rural communities.

Many years ago, the technology of chemical fertilizers and improved varieties had not yet reached most of the farmers in the region. But at present, Brett (1994) said that the rural communities of the Cordillera and Ilocos regions are undergoing change. This transformation is caused primarily by two factors: the extent and the frequency of the interactions between them and the market, and by government policies and programs.

Commercialization is used here to refer to the interaction of the local community with the market- an interaction which changes the characteristics of the production and consumption of the local communities. Initially, this describes the practice from subsistence to commercial agriculture. For example, the shift from purely native rice to partly cash crop agriculture in communities such as Bineng and Suyo in Sagada. This allows the household to generate cash for increasing household needs such as supplementary food, clothing, education, transportation and household appliances as dictated by demonstration effects on the consumption and household investment level and patterns. Rood (1995) added that attitude of the farmers themselves to the future is ambivalent. Overwhelmingly, they want their children to finish college so the children



will not be farmers. Thus, they prefer to produce cash crop and use chemical fertilizers in order to finance their children's education.

A researcher also (Anonymous, 1995) said that through the years, significant changes have taken place in the life and livelihood practice of the Ifugaos. Causal factors include the influence of the lowlanders, education, Christianity, modern technologies and the impact of cash crop economy. The water shortage for "payoh" production is a result of the continuous cutting down of timber. There is insufficient water supply because upper rice terraces are converted into cash crop gardens due to lack of irrigation.

Modern technologies, such as the use chemical fertilizers and pesticides have become popular to some Ifugaos. The introduction of these modern technologies has significantly reduced the biodiversity of the "payoh" affecting, for example the edible shells. The farmers adapted the use of chemicals to improve their harvest and to overcome soil fertility problems.

In order to combat whatever ill effects may result to the changes in traditional cropping systems, Agroforestry farming practices should be maintained because this system can alleviate both economic and environmental problems.



METHODOLOGY

Locale and Time of the Study

This study was conducted in Barangay Guina-ang, Bontoc, Mountain Province (Figure1 and plate 1). It is located in the western part of the Municipality of Bontoc in Mountain Province. The barangay has a total land area of 1,860 ha. It has an average daily temperature of 19⁰C and has an elevation of 1,300 m above sea level. It has two pronounced seasons, wet season during the months of June to November and dry season during the months of December to May 2000 (Provincial Climatic map).

Guina-ang is classified as an Agricultural land, thus farming is the major source of livelihood. Aside from rice farming, swidden farming is also practiced where the people till their “uma” to produce other crops such as “camote” or sweet potatoes and legumes. Their farming practices primarily include raising of woody perennials such as guava, avocado and others, while maintaining their backyard gardens and raising animals such as pigs and chicken.

Respondents of the Study

For this study, sixty (60) respondents observed to be agroforestry practitioners were randomly selected by the researcher. One consideration in selecting for this includes the availability of the respondents during the conduct of the study. Some Key Informants helped identify these informants. Ten (10) respondents would represent each sitios.



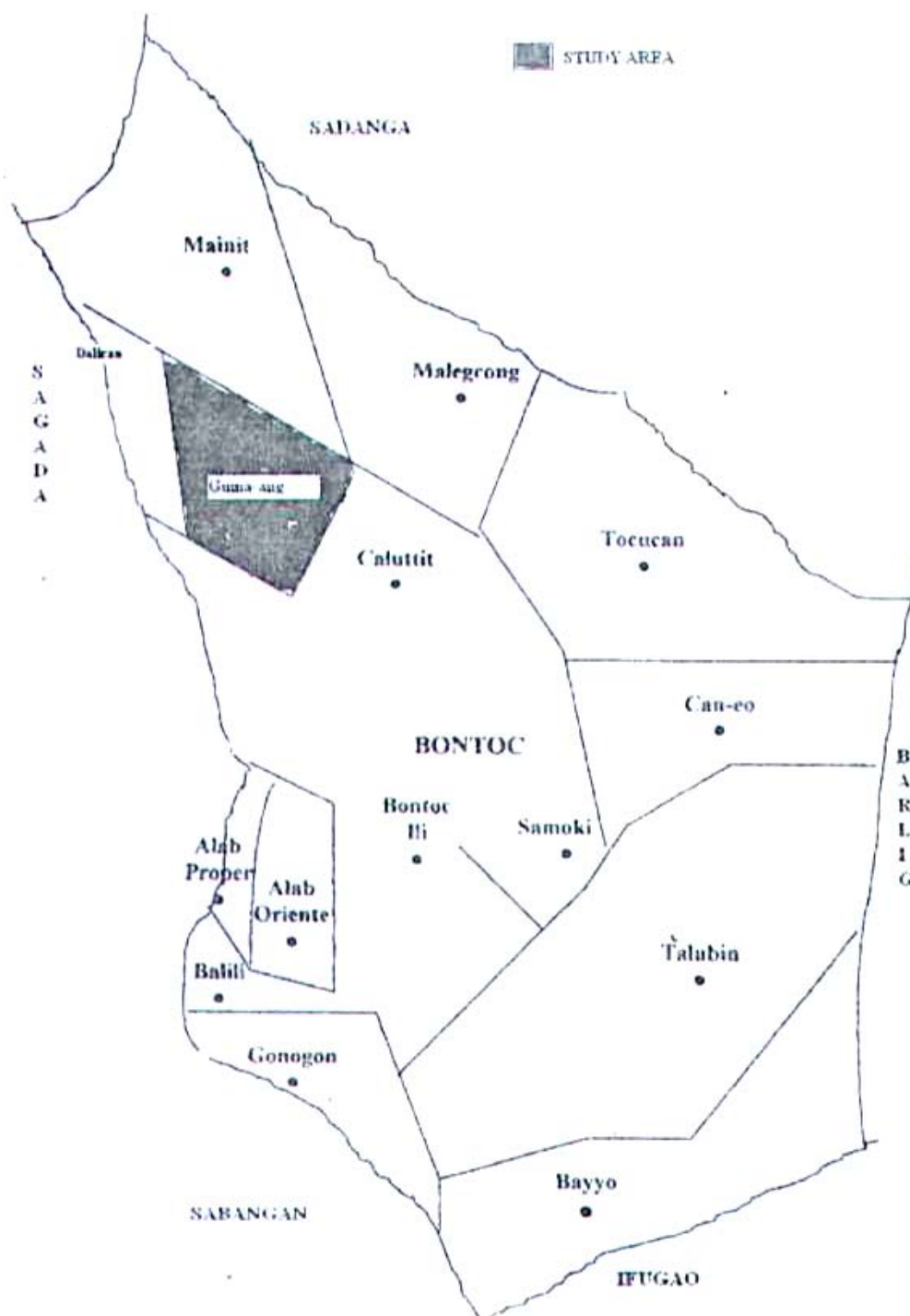


Figure 1. Map of Bontoc Municipality showing the area of study



Plate 1. Panoramic view of Barangay Guina-ang

Data Collection

The researcher mainly used the guide questionnaire when she personally interviewed the respondents. Related questions were raised as part of the informal interview and this enriched the quality of the data gathered.

Data Gathered

1. Transect map: transect walk of the place was made and a map was drawn to reflect the general view of the area in terms of slope of land and resources present in the area (Figure 2).

2. Indigenous Agroforestry farming practices of farmers: This was gathered from the key informants through interview.

3. Existing Agroforestry farming systems and Practices. This was gathered through observation and interview of the respondents.

4. Reason/problem of farmers in modifying their agroforestry system: This was gathered through personal interview with the respondent. Any related researches about the topic were also considered.

Data Analysis

The data gathered was analyzed using descriptive statistics such as mean and percentage for the interpretation of results.



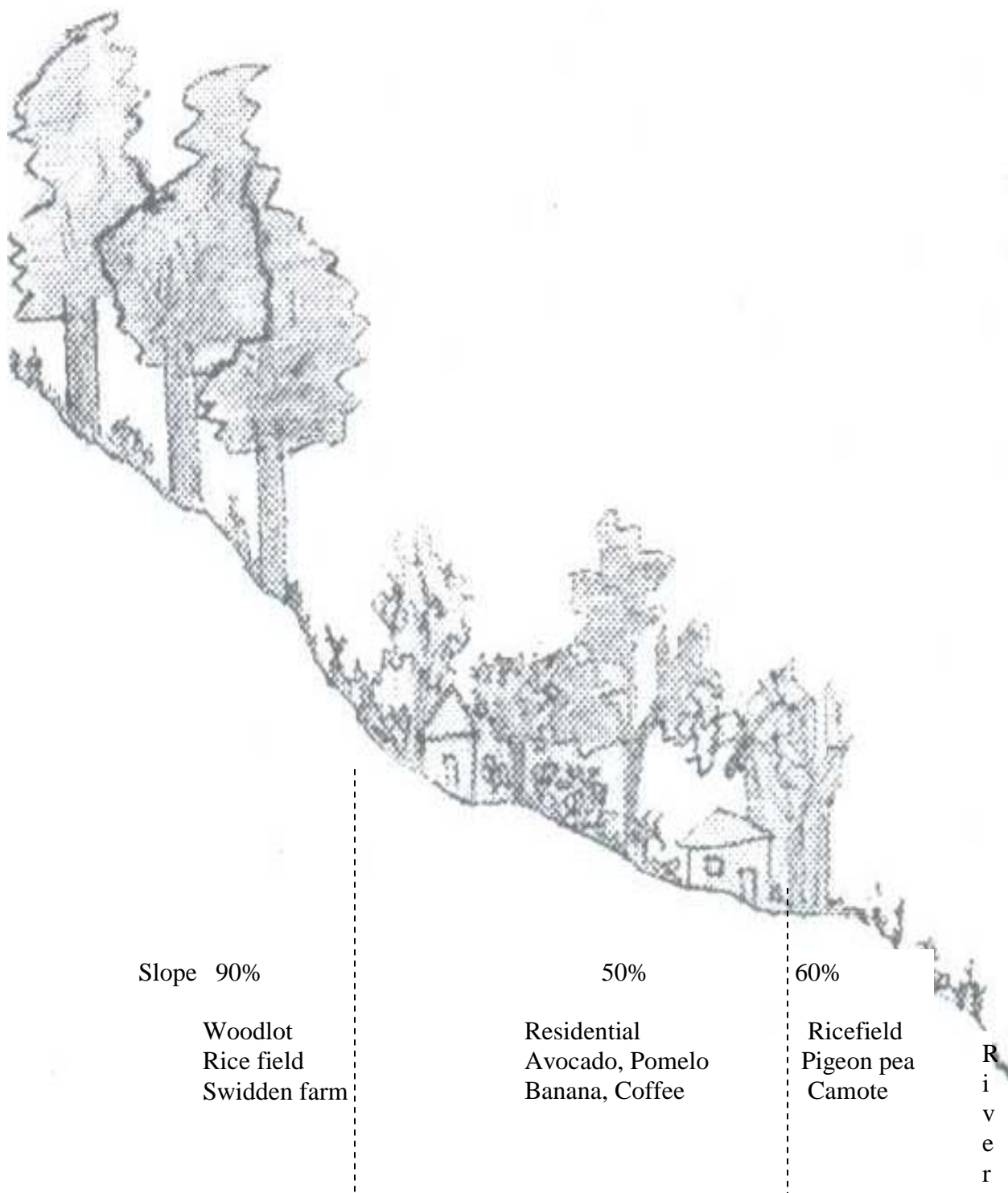


Figure 2. Transect Map of Barangay Guina-ang showing the land use and average slope

RESULTS AND DISCUSSION

A. Profile of the Respondents

The general profile of the respondents is shown in Table 1.

Age. The age of the respondents ranged from 40 to 91 years old. Table 1a shows that 24 (40%) were on the age range of 61 to 70 years old, while 6 (10%) were on the age range of 71 and above (Plate 2 and 3). The rest belongs to age range 40 to 60. This indicates that half of the respondents belong to the senior bracket which is from 61 years old and above while 50 percent belongs to 40-60 years old. The data means that the senior respondents are as active as the rest in farming activities.

Sex. Among the respondents, 13 (22%) were males while 47 (78%) were females. This data, however, does not mean that there is lesser participation of men in farming. In fact, observation shows that men are equally active as women in farming activities. It just happened that during the conduct of the interview, most of the men were not available because of some responsibilities related to the community. Similarly, the respondents explained that men and women share equal responsibility in both farm work and household chores. There is however a division of labor such that men are usually in charge of plowing rice fields with the use of carabao, trap making for animals that destroy plants, cutting of trees and hauling these for fire wood or “mamating” as locally termed and stone walling (“tuping”). Meanwhile women do the weeding and planting. Both men and women do the building dikes of rice paddies (“pakpak”), irrigating (“mananum”), setting of scare crows (“insapor”), harvesting, hauling palay, and driving away of rice/maya birds (“inferew”).





Plate 2. The researcher with some of the respondents



Plate 3. The researcher and her companion interviewing one of the respondents

Table 1. Profile of the Respondents

PARTICULAR	NUMBER	PERCENTAGE %
a. Age		
40-50	13	22
51-60	17	28
61-70	24	40
71 and above	6	10
Total	60	100
b. Sex		
male	13	22
female	47	78
Total	60	100
c. Civil Status		
married	55	91.7
single	1	1.7
widow/er	4	6.7
Total	60	100
d. Number of Children		
0	2	3.3
1-5	49	81.7
6-10	9	15
Total	60	100
e. Educational Attainment		
elementary	16	26.7
high school	2	3.3
college	5	8.3
no formal education	37	61.7
Total	60	100
f. Number of years Practicing Agroforestry		
1-10	9	15
11-20	24	40
21-30	27	45
Total	60	100



Civil Status. As shown on table 1c, 55 or 91.6% of the respondents were married while 4 (6.7%) were widow/ers and 1 (1.7%) is single. This could mean that married farmers are more involved in farming activities here because it is their family's main source of food. On the other hand, the singles have other opportunities like going out of the community to work on "por dia"/ daily wage basis.

Number of Children. Table 1d shows that 49 (81.7%) of the respondents have 1-5 children, 9 (15%) have 6-10 children and 2 (3.3%) have no children. The big number of children partially reflects the typical Cordillera Family. It's part of the notion that children are one's future support system not only economically but also socially. So couples prefer many children to help them in their farm work. It is also believed that parents will be taken care of by their children of when they grow old.

Educational Attainment. Thirty seven (61.7%) of the 60 respondent, did not have formal education; 16 (26.7%) reached elementary; 2(3.3%) reached high school; and 5 (8.3%) reached college. This implies that most of the respondents did not undergo formal education. The respondents shared that their parents prohibited them from going to school and pushed them to help in the farm work. They believe that when their children will go to school, they will become lazy and will no longer help in the farm work. Who then will continue to take care of the farms and how will the coming generations survive if the farms get abandoned?

Number of Years Practicing Agroforestry. Most of the respondents have been farming for a long period of time. Results in table 1f show that 27 (45%) had been practicing agroforestry for 21 years or more; 24 (40%) for 11-20 years; and 9 (15%) for 1-10 years. During the interview, most of the respondents did not know the term



Agroforestry. The interviewer defined and described agroforestry in their own dialect and they came to agree that agroforestry is no other than what they are doing for their livelihood. During the sharing and discussions, it was realized that agroforestry is practiced not only because the farmers wanted to provide food for their family. Aside from this, their agroforestry practices had a lot to do with the efficient use of natural resources. For instance, they plant woody perennials to minimize soil erosion and at the same time provide a sustained supply of water to their “payew” or rice fields. This practice helped maintain the ecological balance of the farm while providing food.

B. Farm Information

Table 2a presents the farm size of the respondents. Forty seven (78.3%) of the respondents have an Agroforestry farm of 500 m² to 1000 m² and the remaining 13 (21.7%) have a farm of 1001 m² to 1500 m². These measurements, however, are estimates given the fact that the farms of individuals are by “kerreng” or pieces of lands/or small lots/ terrace and are located in different areas. Hence the total farm area is difficult to measure. The data however indicates that the size of their farm in the study area is generally small.

As shown on table 2b, all of the respondents claimed that they have an irrigated farm, but, there are some respondents 16(27%) who maintained farms that are not irrigated, which according to them, is the swidden farm. This indicates that there are some respondents who maintain both swidden farms and irrigated farm during a certain period of the year.

Table 2c shows the source of irrigation of the respondents. Similar to table 3, those 16 (27%) who maintained swidden farm, claimed that their farms are mainly



dependent on rain for irrigation. Finally, all of them claimed that flowing water (rivers, creeks, wells and springs) is the source of farm irrigation. This implies that there is relatively enough source of irrigation, such that the farmers before were able to maintain two rice cropping in a year. However, at present the respondents explained that deforestation resulted to scarce water.

Table 2 Farm Information

PARTICULAR	NUMBER*	PERCENTAGE %
a. Size of Farm		
500-1000 m ²	47	78.3
1001-1500 m ²	13	21.7
Total	60	100
b. Farm		
Irrigated	60	100
Not Irrigated	16	27
* Multiple Responses		
c. Source of irrigation		
Rain	16	27
Flowing water (river, creeks, wells and spring)	60	100
* Multiple Responses		

C. Farming Systems and Practices

Agrisilvipastoral (agricultural crops + livestock + forage crops) system is commonly practiced by the respondents. Farming practices under this is rice field with trees and draft carabao; and backyard or home gardening with native pigs and chicken (Plate 4a and 4b).

They also practice the agrisilvicultural system (involves the combination of agronomic crops such as rice, vegetables with horticultural crop, and or forest trees (Plate 5a and 5b). It was observed that nobody was growing trees in association with animals.

Agricultural crops, fruit crops and forest trees integrated in this system are shown on table 3. It shows that all of the respondents plant rice, sweet potato, corn, legumes, cassava, squash, sugar cane and banana. For fruit trees/crops, 26 (43) have coffee and guava, 21 (35%) for mango, 23 (41%) for pomelo and 14 (23.3%) for avocado. For forest trees, all of the respondents claimed that there are Benguet pine on their farms and 2 (3.3%) have alnus. For animals, all of the respondents raised pigs and chickens, 13 (21.27) have carabao and 2 (3.3%) raised ducks.

These results shows that all of the respondents plant rice, their main crop while sweet potato is grown to serve as supplement to rice and at the same time provide feed for the pigs. Legumes, squash and corn are grown seasonally by all respondents on their swidden farms, home gardens and/or beside the rice fields. According to them they raise native pigs and chickens, which are prescribed for religious rituals and at the same time, their manure is used to fertilize their farm.



Agrisilvipastoral system



Plate 4a. guava, banana, sweet potato, taro “lakat” with pig



Plate 4b. Guava, pomelo, avocado, banana, with native chicken and swine

Agrisilvicultural system



Plate 5a. Mango, banana, cassava, corn, lemon grass and sweet potato in mixed planting.



Plate 5b. Corn integrated legumes (pole snap bean, mung bean and lima bean).

Table 3. Plants and animals commonly integrated in agroforestry System

PARTICULAR	NUMBER *	PERCENTAGE%
a. agricultural crops		
rice	60	100
sweetpotato	60	100
corn	60	100
legumes	60	100
squash	60	100
cassava	60	100
sugar cane	60	100
banana	60	100
b. fruit trees/crops		
coffee	26	43.3
mango	21	35
pomelo	23	41.7
guava	26	43.3
avocado	14	23.3
c. forest trees		
benguet pine	60	100
alnus	2	3.3
d. animals		
pigs	60	100
carabao	13	21.7
chickens	60	100

* Multiple Responses

Aside from these observations, the respondents claimed that they were still practicing these agrisilvipastoral and agrisilvicultural system because as they said they are safe, require simple operation, and entail lesser expenses. Until now, all of them are still doing manual cleaning, direct seeding and harvesting for their crops. Transplanting however is practiced with crops like rice and patchay. Tools that are employed are simple like the spading fork, shovel and others.

In plowing the fields, farmers employ the carabao so this animal plays a very important role to the farmers. But despite the tedious and manual farm works, the farmers



developed a communal ethos like “ob obfu” (traditional exchange labor) where in they help each other in the farm like harvesting of rice. (Plate 6). Aside from the reality that work is accomplished faster through this, unity and cooperation is also instilled among them.

In terms of farm inputs, the farmers utilize organic fertilizers. Such practice was learned from their parents and their fellow farmers. According to them, the organic fertilizers that they used were animal manure, sunflower, rice stalks, coffee pulp and legumes. During land preparation of both irrigated and non-irrigated farms, they slash sunflower plants and directly incorporate these into the soil to serve as green manure.

At present however, the use of inorganic fertilizer is very common. The respondents relate that the use of inorganic fertilizers is to their advantage in the sense that it is more convenient to just buy it from the market compared to the gathering of organic fertilizers, which requires a lot of effort and time.

As a coping mechanism with the effect of pests, animals and plants that were observed to have been infected were better removed. For instance, they usually remove the plant parts that are infected with pest and diseases. If animals such as pigs and chickens are infected with pest and diseases, they immediately butcher the animal to avoid or prevent the other animals from getting infected with the same disease.

Young farmers who are already involved with cash crop gardening are now employing chemical pesticides in their farms especially if a portion of their farm is planted with crops like pepper, tomatoes, string beans and the like. They want to ensure that their crops will grow faster and bear good fruits so that they can sell it and be able to recover their expenses.





Plate 6. Performing “ob obfu” or exchange labor during harvest time.

Table 4. Farm management and Practices

PARTICULARS	NUMBER	PERCENTAGE %
a. cleaning		
manual cleaning	60	100
burning	0	0
Total	60	100
b. planting		
direct planting	60	100
transplanting	60	100
* Multiple Responses		
c. fertilizer		
organic	0	0
Inoragani	0	0
Both organic and organic	60	100
Total	60	100
d. ways to control pest and diseases		
chemical	47	78
physical	60	100
* Multiple Responses		
e. harvesting		
manual	60	100
Total	60	100

D. Modifications in farming Practices

Due to the need for immediate cash in order to support the education of their children, the farmers tried to modify or adopt some innovations in their farming practices. Table 5 shows, the modification in farming practices of farmers in Guina-ang, Bontoc, Mountain province.



Table 5. Modification in farming practices

PRACTICES	TRADITIONAL	CHANGES
a. Crops	▶ Native varieties of rice, sweet potato, legumes, squash and other traditional crops.	▶ High yielding rice, and cash or commercial crops such as pepper and tomatoes in place of native varieties
b. Animals	▶ Native pigs and chicken	▶ Hybrid such as landrace, and sasso for chicken
c. Fertilizer	▶ Purely organic or compost such as sunflower, rice hull, rice straw and animal manure.	▶ Organic plus inorganic such as 14-14-14, 21-0-0 and others
d. Fertilizer application	▶ No commercial fertilizer or pesticide is used. Rather, rice stalks, rice hull, coffee pulp and sunflower cutting are left to decompose on the fields to serve as natural fertilizer.	▶ They just broadcast the in organic fertilizers. Every time they plant they apply urea, complete, and other inorganic fertilizer and less application of compost.
e. Seed selection	▶ Most farmers select their seeds after harvest, while others make their choice in the field. Farmers who select after harvesting may just put aside part of their harvest, but they can also make careful selection for a particular seed appearance.	▶ The farmers can not already select the best seeds because some of their crops are new to them or not familiar to them.
f. Ways in controlling pest and diseases	▶ Physical control such as using rat guards; biological control such as not killing the predators; cultural control such as synchronized planting and weeding the canals; and performing rituals such as rest day “te-er” to prevent the spread of pest and diseases.	▶ From the traditional they included the use of chemical in controlling pest and diseases. For example they use racumin and other chemical spray.



D. Problems of farmers

According to the respondents, since they started to modify some of their farming practices they encountered some problems on their yields. According to them, the yield of their plants nowadays is lesser as compared to their younger years in farming. From the data gathered, a number of problems emerged through time in the farming practices that resulted to the reduction of yields. Some have natural causes, while others are man made.

1. Decreasing water supply

Guina-ang is rich in water sources for irrigation on crops. However, these are also threatened due to fast forest denudation brought about by rampant forest fire especially during summer. This situation contributed to the reduction of yield.

2. Deterioration of the soil

The respondents said that the soil of their farm is becoming hard and dry and the fertility of the farm soil is being depleted. According to the respondents, the repeated cultivation and application of inorganic fertilizer destroys natural aggregation, and reduces organic matter content in the soil. Using inorganic fertilizers also, limit the movement of water and air into the soil.

3. Increased pest and disease problems.

Infestation of crops by rats has become more frequent and led to a significant reduction in yields of their rice, sweet potato and other crops. Golden kuhol also become a serious pest of rice because they attack the base of the young seedlings before devouring the upper parts.



4. Labor scarcity

This was not a problem in the past, but due to the number of children supported through tertiary education, parents are pressured to seek cash paying jobs in other places.

E. Factors that contributed to the occurrence of problems in Guina-ang, Bontoc, Mountain province.

1. Decrease in Agricultural Land area

The increase in population resulted to the decrease of land area for each farmer to till. As a result, farmers at present are developing their swidden farm towards permanency because the usual fallow period of fifteen to twenty years is now impossible due to limited areas for expansion. The increase in population also resulted to the conversion of farmlands to residential lands. In relation to this, cutting down of trees both for building houses and cooking resulted also to the shortage of water supply.

2. Education

It was observed that the introduction of formal education also is one factor that affected the farming practices in Guina-ang. The need to send children to schools for formal education shifted the priority of some parents from farming works to contractual works outside the community. More so, many educated youth especially when they become professionals, no longer attend to farm works. In effect, many farms are abandoned because of the shortage of farm workers.



3. Introduction of Inorganic Fertilizers

The traditional agricultural crops of the village are also affected by the use of inorganic fertilizers like chemical pesticides mainly to sustain the cash crops being grown. The respondents explained that when they started using the inorganic fertilizer the yields of their crops is very high, but now, they observed that the quality and yield of their crops became less and smaller in size. Moreover, they observed that their crops especially sweet potatoes are easily rotten.

4. Rituals Related to agriculture

These rituals are the coping mechanisms for the agricultural stresses.

According to the respondents, performing rituals is an effective way in preventing rats from damaging their plants especially the grains. But now due to the introduction of Christianity, some farmers don't believe in the rituals so that during the implementation of this "te-er", instead of having their rest, a lot of farmers to go outside the community, and one of the respondents said that this is one factor why their crop production is reduced

According to Scott (1969), he mentioned that rituals and sacrifices are done to attract spirits who will make the plants grow and to appease the spirits who might harm the plants. Likewise, rituals play a very important role in the life of the farmers in Guina-ang. In order to have a successful result in production, they perform these rituals.

- a) *Te-er si Khiling*- Before the panaran (small parcel of ricefield) is prepared for the sowing of seeds, locally called "panar", the rest day ritual called "te-er si khiling" is performed. During the rest day, a native chicken is butchered and



prayers are recited to call the attention of the ancestor's spirit and also to Lumawig (God), so that they will bless the incoming farm activity of sowing seeds "pumanar". This is to ask the guidance of the spirits so they will increase the seedlings to be abundant when transplanted; and to protect their seedlings from rats, chicken and other animals, which may destroy their seedlings. In the procedure of sowing seeds, they will strew first sunflower, ash or rice hull as they lessen or drain water to serve as fertilizer. After that, they will sow the seedlings and have runo (*miscanthus*) leaves or anything that will warn the animals not to destroy the seedlings.

- b) Te-er si Surat- When the rice are already transplanted, a rest day ritual called "te-er si surrat" will be performed. If the authorized men will reached the rice field, where the "surat" will be placed, a short prayer will be said "Now I brought the surat here as what our forefather did, Lumawig (God), please keep the rats and disease away from our crop". The message of this ritual is to block the holes/burrows of rats or to prevent the rats from transferring disease from other places.
- c) Te-er si Lusad- When the villagers observed that the palay starts to produce grains; they declare the "te-er si lusad". The villagers take a rest to make the activity successful and scarecrow effective. The message of this ritual is to allow the villagers to go to their fields and make scarecrows in order to frighten the maya birds from damaging rice crop. Farmer's must also be present to physically supplement these in driving the mayabirds away while cleaning the field surroundings.



- d) Te-er si Saar- When the grains are fully matured, the villagers will have a rest day ritual called “te-er si surat”. The message of this ritual is to ensure the abundant harvest or to maximize production of rice. The villagers come to help each other through “ob-obfu” (exchanged labor) to finish the work faster.

In this ritual, visitors are not allowed to enter in the village and villagers are not allowed to go outside the village and no one is allowed to go to the farm.

F. Possible Solutions

According to the respondents, possible solutions to these problems bring experienced by the farmers include the following:

1. Reforestation of the forest and mountains. The Barangay should initiate a program to involve the community in tree planting because the farmers believe that the trees produce water and water is very important to their farms.
2. They also expressed that that young generation should still learn to do farm works. Even though they finished their studies they should know how to plant, because all food that we take in comes from the plant.
3. Another possible solution is to minimize the use of inorganic fertilizer or totally avoid it.
4. Conduct of rituals should also be more practical. We can not avoid this because in reality, it strengthens unity, solidarity, peace and love, respect and industriousness.



SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary

The study was conducted to describe the changes in the traditional Agroforestry farming practices of farmers in Guina-ang, Bontoc, Mountain province and to identify the reasons why farmers are modifying their farming practices.

The study used the method of a qualitative research. The respondents observed to be agroforestry practitioners were randomly selected. One half of the respondents aged 40-60 years old, while the rest were aged 61 and above. Majority were female, married, and did not have formal education.

The farmers have small (500-1500 sq.meter) and irrigated farm. Their sources of irrigation are from river, wells, spring, creeks and rain.

The respondents identified two traditional agroforestry farming systems in the area. These are the Agri Silvipastoral and Agri Silvicultural. All of the respondents raised traditional rice varieties, sweet potato, corn, legumes, squash, cassava, and banana. The domestic animals raised are pigs and chickens. These plants and animals are integrated either on swidden farm, rice field or home garden. Benguet pine is the dominant forest cover.

These traditional farming practices still exist because they are safe; require simple operation and lesser expenses. Practicing these also instills unity in the community as manifested in the conduct of rituals related to agriculture and the communal ethos practiced.

Due to some factors like education, use of inorganic fertilizers and introduction of Christianity, there are already changes happening both in the process of



farming and at the same time to the quantity and quality of crops produced. According to the respondents, the yield of their plants decreased due to the shortage of water, instability of the soil, occurrence of pest and diseases and labor scarcity.

Because of these problems, respondents suggest planting more trees and avoiding the use of inorganic fertilizer and practical use of rituals.

Conclusion

The traditional agroforestry farming practices of farmers espoused the use of organic fertilizers particularly compost that maintain the fertility of the soil. The benefits derived from these practices, include more harvest, less cash expenses, soil conservation and the strengthened unity among the people through the rituals and “ob-obfu” that serve as social glue that maintain unity and friendship of the community people.

Recommendations

Based on the results gathered, the following are recommended:

1. New varieties/ cash crops maybe adopted as long as it is compatible with cultural practices, and indigenous varieties must not be sacrificed.
2. There should be trainings for farmers in the locality in order for the farmers to be aware or to be educated on proper farming.
3. Farmers should maintain their traditional farming practices because these practice improve soil fertility and prevent the attack of pest and diseases.



LITERATURE CITED

- ANONYMOUS. 1995. "The Way We Live" Indigenous Practices of the Ifugaos, Atis and Badjaos of the Philippines. Cooperative Branch International Labour Organization.
- BRETT, J. 1997. Coping Strategies in Bontoc Highland Agroecosystem. The Role of Ritual. CSC Working Paper 01. Baguio City. Cordillera Studies Center, U.P. Baguio.
- BRETT, J. 1994. Comparative Study of Agricultural Commercialization in Selected Highland Communities of the Cordillera Ilocos Region. CSC Working Paper 24, Baguio City. Cordillera Studies Center, U.P. Baguio.
- CPA (CORDILLERA PEOPLES ALLIANCE) 2002. Rotational Agriculture of Indigenous Peoples in Asia, Case Studies Analysis and Recommendations. International Alliance of Indigenous Tribal People of the Tropical Forests (IAITPTF).
- ENCYCLOPEDIA OF AGRICULTURAL SCIENCE. 1994. Vol. I. A – D Academic Press Inc.
- PCARRD (PHILIPPINE COUNCIL FOR AGRICULTURE AND RESOURCES RESEARCH AND DEVELOPMENT). 1986. The Philippine Recommend for Agroforestry. Technical Bulletin Series No.59. Philippine Agriculture Resources Research Foundation, Inc.
- PCARRD. 1991. Agroforestry Research in the Philippines.
- ROOD, S. 1995. Indigenous Practices and State Policy in the Sustainable Management of Agricultural Lands and Forests in the Cordillera. A Summary Report. CSC Working Paper 25. Baguio City. Cordillera Studies Center, U.P. Baguio.
- SCOTT, W.H.. 1969. On the Cordillera. MCS Interprises, Inc.
- STEPPLER and NAIR. 1987. Agroforestry: A Decade of Development. ICRAF. Nairobi, Kenya.

