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Indigenous agroforestry practices in the Cordillera

1. GENERAL INFORMATION

1.1 Title of practice or experience

Indigenous agroforestry practices in the Cordillera, Philippines

1.2 Category of practice/experience and brief description

Agroforestry management has become a key term in environmental conservation. The wealth of knowledge among forest dwellers gives an insight into the centuries of practice and experience that are embedded in the cultures of indigenous peoples and other forest dwellers. This knowledge, however, has been eroded with inappropriate development initiatives being imposed on indigenous and rural communities.

Environmental management, as part of the indigenous peoples' daily life, includes the management of available resources. For the indigenous peoples of the Cordillera, Philippines, this, in the main, is the forest since most of the habitat of the Cordillera indigenous peoples is in the forests.

1.3 Name of person or institution responsible for the practice or experience

Selected villages in the provinces of the Cordillera region, Philippines

1.4 Name and position of key or relevant persons or officials involved

The practices described here started centuries ago, were developed over generations, and are still being practiced by the indigenous people of the Cordillera. The practitioners of woodlot management are clans, families or individuals. Thus, it **is** difficult to name any particular individual involved in the practices. However, the Montanosa Research and Development Center (MRDC), which is based in Sagada, Mountain Province, can be contacted for

exposure to villages where these kinds of agroforestry practices exist. Mathew Tauli is the Executive Director of MRDC.

1.5 Details of institution

(a) Address: Makamkamlis, Sagada, Mountain Province, Philippines

1.6 Name of person and/or institution conducting the research

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2. THE PROBLEM OR SITUATION BEING ADDRESSED BY THE PRACTICE/INNOVATIVE EXPERIENCE

Agroforestry has been defined as "a collective name of land-use systems and technologies where woody perennials (trees, shrubs, palms, bamboos, etc.) are deliberately used in the same land management unit as agricultural crops and/or animals either in some form of spatial arrangement or temporal sequence." (Lasco, **1986)**

There is no word for "agroforestry" in the Cordillera region of the Philippine archipelago. But the land and forest are part of the life of the indigenous peoples of the region. And they have practiced systems that nurture the land and forest for centuries.

For the Igorots of the Cordillera, the forests are more than just sources of wood, lumber, and exotic plant and animal species; the land is life itself. It is the source of their food, it is their wealth, it is the playground and training ground of their children, it is their home. They must nurture the land and the forests so it shall remain capable of nurturing them.

Religious and traditional beliefs, practices and rituals have evolved out of the people's relationship with the land and the forest. Socio-political institutions also play a significant role in the control, use and management of lands,

in addition to determining a tribe or clan's territorial boundaries. The land and the forest play an important role not only in the economic aspect of their life, but also in the development of their culture and religion, their socio-political systems and their community in general.

"Igorot" is the collective term used to refer to the indigenous peoples in the Cordillera region of the northern Philippines. These include the Bontocs, Kalingas and Apayaos; the Ibalois, Kankanais, Isnegs and the Ifugaos (though the Ifugaos simply prefer to be called Ifugaos).

The region is presently divided into five provinces, namely, Kalinga Apayao, Mountain Province, Abra, Ifugao and Benguet. The region is so named because it is a cord of mountains that form the backbone of the northern part of Luzon, the Gran Cordillera, the highest and largest mountain range in the Philippines. It is characterized by steep terrain and some of the high peaks in the Philippines.

There are three main types of forests found in the Cordillera. These are the dipterocarp, the Benguet pine and mossy forests. These forests make the Cordillera a rich source of hardwood, pine products, pulp, and a wide variety of plant and animal species.

The dipterocarp forest of Apayao (an area covered by the province of Kalinga Apayao in the Cordillera region) is thickly vegetated with natural timber forest species like the apitong *(Dipterocarpusgrandiflorus)*, white lauan *(Shorea contorta)*, red lauan *(Shorea negrosensis)*, yakal *(Shorea astylosa)*, tangile *(Shoreapolysperma)*, mayapis *(Shoreapalosapis)* and guijo *(Shorea guiso)* (Viray, 1992). The people use this for building houses and for furnishings inside their homes.

The soil in the Apayao area of the Cordillera region is generally fertile. The abundance of vegetation in the area proves this. Various moss species are also found in some areas and the proliferation of ferns indicates a high content of nitrogen, phosphorous and potassium compounds. Other minor forest products, non-timber forest products and medicinal plants are also abundant in the area. In addition, there are scattered species of orchids and ornamental plants. Rattan, pandan, palms like *ubod, anahaw* and *taraw*, as well as different bamboo species are also abundant. The indigenous people utilize these for weaving baskets and other native handicrafts which they use in their homes and as containers for the seeds and other crops (usually tubers) which they gather from their farms.

The mossy forests of the Cordillera are characterized by stunted tree vegetation usually covered with mosses, lichens, liverworts, epiphytic herbs and ferns, rattans, pandanus, strange bottle-shaped myrmecodias as well as shrubs and climbers of many different families (Viray, 1992). Though oak species and mosses are the dominant vegetation in this type of forest, rare orchids,

wild food and medicinal plants also abound.

The faunal composition in mossy forests includes the Philippine deer *(Cervus* sp.), the wild pig ***(Sus*** *celebensis),*tree shrews *(Tupaia* sp. *and Urogale* sp.) and ground shrews *(Suncus* sp. and *Crocidura* sp.). It has been reported that in Mt. Polis (also called Mt. Amuyao), a mossy forest located at the provincial boundary of the Mountain Province and Ifugao, both within the Cordillera region, wild deer, monkeys and wild pigs can still be sighted in certain areas. Some people also believe that this particular forest serves as a transit area for migratory birds (Estigoy, 1995).

Meanwhile, pine trees grow well in the high plateaus of the Cordillera mountains. The Benguet pine *(Pinus insularis)* is the only pine species in the region (Viray, 1992). The natural pine stands, which are valuable sources of fuel called *saling* because **of** their resin content, are generally quite open and subject to frequent fires. The wildlife present in Cordillera's pine forests includes rats of the genera *Crateromys* and *Phloemys*. Avian species like *Zosterops, Dicaeum, Neotarinia, Pyrrhula, Loxia* and *Erythrura* can also be found here.

The geophysical feature of the region gives it a climate that is the coldest in the country, especially from November to February. There are two marked seasons – dry and wet. The dry and wet seasons vary by province, but generally, the dry season starts in about November and lasts up to April. Afterwards, summer rains come to start the wet season. From July to October, typhoons occur. Observations in recent years have shown some shifting in the arrival and occurrence of typhoons and even of the wet and dry seasons. **Lo**cal sources claim that these changes could be effects of the region's slowly disappearing forests.

In the past, some government agencies have blamed the people's slash-and-burn *(kaingin)* farming for the destruction of the forests. But the people claim otherwise. They say they have been practicing their indigenous systems of farming for centuries and have maintained the richness of the forest. Meanwhile, local sources said, the government has been granting not only logging concessions to foreigners and the rich Filipino elite but also mining privileges to different foreign corporations. These, they say, along with other so-called development projects imposed upon the people in the region, are the reasons behind the loss of the Cordillera's rich forests.

3. DESCRIPTION OF THE PRACTICE/INNOVATIVE EXPERIENCE AND ITS MAIN FEATURES

Among the different indigenous peoples in the Cordillera, several variations of agroforestry management and development have evolved. The settle-

ment patterns, climate, socio-political organization **of** the settlements and the vegetation in the area have something to do with the variations. But all the community groups have developed a system of caring for the land and forests. This occurrence is rooted in their common concept of land.

Indigenous concepts

The people view themselves as stewards or caretakers of the land. "The land was considered free to anyone who was willing to till or develop it. They did not 'own' the land as it was not to be 'owned' but to be treasured and drawn life sustenance from ..." The indigenous peoples could not, would not, recognize claims of ownership based on pieces of paper and deeds of titles. "How," a famed tribal leader and martyr had once said, "can man own something which will outlive him?" (Angelo and Reyes, 1987).

"Ownership of the land, of the trees which grow from it, of the wealth in its bowels, or of the grains and tubers it could be impregnated with, was a temporary gift of the gods and nature to whoever of them would till or dig, extract or harvest the same for their needs." It was within this "matrix of meaning" that the indigenous peoples of the Cordillera recognized "ownership'' of the land by those who use the land. And it is within this context that they cared for the land as they used it (Angelo and Reyes, 1987).

The land, forests, rivers and other natural resources were held in common by the tribe or indigenous inhabitants of a specific area. Certain irrigated rice fields and woodlots, meanwhile, could be "owned" privately by kinship groups. But these types of "ownership", especially of the woodlots, were more indications of responsibility than of ownership as understood by Westerners. For instance, those who "owned" woodlots had the social responsibility to safeguard and nurture the woodlots. Other people who wanted to access the resources (wood for fuel, etc.) within that woodlot could do so, but with permission from the owner, who is expected to guide that person through the process and inform him about which branches **of** what tree could be cut and which could not. The one who was granted permission, on the other hand, also has the obligation to take care of the woodlot, as he has benefited from it. He must contribute to nurturing the woodlot by clearing or weeding a certain area within the woodlot before he leaves. No exchange of cash takes place, only of obligations and responsibilities to the land that commonly provides for them.

Weaver (1979) listed several requirements for a viable agroforestry system, which include the conservation of soil and water; crop diversification to reduce the risks of plague and infestation; and an emphasis on crops with low fertility requirements. Sajise (1979) mentioned several ecological guidelines for agroforestry development in the Philippines. He stated that the system

should not only be productive but also be protective. It should prevent soil erosion and maintain genetic diversity and stabilize the hydrologic character and microclimate of the area. He added that the system must also attempt to utilize more biologically-sustainable inputs and indigenous resources instead of fossil-based fuel and external inputs.

Similarly, Riategui (1979) enumerated several natural principles on which an integrated agricultural, livestock and forestry production system should be based. First **is** the principle of diversification of species in a single unit area. Riategui observed this to be a general rule in nature. Things grow in a diversified, mixed or combined way, he said. Another is the principle of restoration of soil fertility. This, he said, is accomplished by the continual accumulation of organic matter in the surface of the soil and by the recirculation of nutrients between the soil and the forest.

Many of the indigenous people of the Cordillera were unable to study in academic institutions, and most are unable to articulate their beliefs and practices in a language considered "scientific" by many scholars and scientists. But they have, through the ages, admirably adhered to these very same requirements and guidelines. Most of the guidelines and principles they hold are in their own language and are based on ages of experience, on their customs, traditions and spiritual beliefs.

The main economic activity of the people is wet rice terrace or pond field farming. The terraces are their main source of food. But they also engage in swidden farming as an additional source and to ensure food supply in case of terrace damage. Aside from these, the people also use the forest as an important source of lumber, fuel, water and additional food. According to the people, the forests also protect their surroundings, especially their pond fields, from erosion.

Their traditional knowledge and systems evolved through centuries of practice, repeated and developed by each generation and, in turn, sustaining and developing each generation. Their deep understanding of the interrelationship of natural forces and how man can maximize its use without destroying it, has sustained not just a family or a clan but whole communities; and not just for years but for centuries. Academic scholars claim these practices are not scientific. But for the indigenous people, the question is not whether a practice can be considered scientific or not. The question is whether it works or not.

The rice terraces of Ifugao

The province of Ifugao is characterized by rugged mountains, massive forests and rivers, and by gently rolling hills and plateaus. It is bounded on the

north by the Mountain Province and on the west by Benguet. The Mt. Polis range separates the provinces of Benguet and the Mountain Province from Ifugao. On its southwest stands Mt. Pulog, the second highest mountain in the entire country. Ten municipalities comprise the province, one of which is Banaue, the most popular because of the famed Banaue Rice Terraces.

The rice terraces of Ifugao have been called by many **as** the "Eighth Wonder of the World" not only because of their scenic beauty, but also because of the incredible skill and ingenuity with which they have been built by generations of indigenous people. They are farmers, engineers, artists and ecologists rolled into one.

Building rice terraces is not only labor-intensive, it also requires an in-depth understanding of the different natural forces at work in a mountainous terrain where one wants to plant agricultural crops. "In building a terrace, first, the farmer has to look for a place where the slope is not so steep, where there is enough water supply, where earth materials are available and the soil is fertile; and where there is enough space for future expansion of the generations to come. In olden times, one also had to consider the security and defense of the land in choosing a location" (Angelo and Reyes, 1987).

A location that meets all these requirements is not easy to find. And when found, the indigenous farmers face the more difficult task of "engineering the forces of the earth" and organizing themselves for the momentous task of shaping the mountains for their survival. If the people are unable to find a location near a water source for the irrigation of their fields, they construct additional irrigation canals, sometimes several kilometers long, from the water source to the pond fields. These canals are likewise used as vehicles for transporting the soil and stones they need for the construction of the stonewalls. More often though, the large stones are carried up the mountains manually from the riverbed below the mountains.

The people cut a level area into the hill and build a stonewall to retain the soil. They set aside the topsoil and fill the foundation with levels of sand and gravel of varying coarseness. Clay is used to cement or line the walls and make the terrace waterproof. More earth materials are filled in while the stonewall is built up to the appropriate height. The terrace is then filled with the topsoil (Bever, 1955; Conklin, 1980).

The terrace builder also considers the type and quality of the stones to be used in building the stonewall. Not any stone would do, and not any shape would fit. In addition to this, the builder must also remember to put jutting stones at the right places to serve as climbing steps most needed while tending the farm. But most important, he must find a way for the water to pass evenly throughout all the levels of the terraces. In relation to water flow, the builder also sees to it that the terraces do not disturb the contour of the mountain.

Otherwise, a landslide could occur and bury the pond fields, destroying all that has been accomplished (Angelo and Reyes, 1987).

After the construction of the terrace, its maintenance becomes a periodic task. The retaining stonewalls have to be cleaned. Weeds that weaken and crumble the walls are removed (Angelo and Reyes, 1987). The same is done for the waterways or canals which provide water to the paddy. After heavy rains or a typhoon, and also after the harvest period, repairs are done on the rice terraces.

The Ifugao system of forest management

The Ifugaos practice a system they call *rnuyong* or *pinugo*. The muyong or pinugo is the Ifugao version of the woodlot. Many say the practice is as old as the rice terraces. It is, so far, the most studied agroforestry practice in the Cordillera. From the muyong, the family or clan gets its fuel, lumber for housing and woodcarving, and some food. Nowadays, cash crops and fruit-bearing trees planted in the muyong have also become an additional source of income for the people. In addition to these, the Ifugaos also claim the muyong is the best preventive measure against soil erosion. But the most important role of the muyong is that of a watershed.

In one Ifugao community that was studied, "the maintenance of the muyung was directly related to ricefield cultivation, such that the primary responsibility of the ricefield owners was to maintain a certain muyung from where their irrigation comes" (Montanosa Research and Development Center, 1992). The people usually choose to develop a certain portion of the mountains that is located just above their rice terraces, near their settlement. And because it is near a settlement, it is easily guarded and taken care of, while conveniently supplying their terraces with the much-needed irrigation.

The muyong may seem like a wild forest to the untrained eye, but it is actually a carefully managed resource, either communally, by a clan or family or even individually (Montanosa Research and Development Center, 1992). The borders of the muyong or pinugo are delineated not by fences but by neat squares or rows of tall trees, natural terrain features, and occasionally-cleared stretches of low-grown plants (Cordillera Schools Group Series, Volume I, 1987). The size of a muyong or pinugo ranges from a few hundred square meters to around five hectares. The size as well as its quality varies, depending on the size of the rice terrace or pond field of its owners. It is most often an area that used to be a swidden farm. After four or five years of use as a swidden farm, the Ifugaos allow trees and other plant species to regenerate themselves. Afterwards, the area is cleared of weeds and other undesirable plant species that hamper the growth of the more important plant and tree varieties.

Fruit-bearing trees, like varieties of oranges, or betel nuts, coffee and banana, are then planted in the area. Other trees that can be sources of lumber are also planted. Examples of these are the galiagiwon tree which is used for house posts, the hawili tree, for beams, the strong bakkuwog tree for flooring and walls, and the polayon, which is a fast-growing tree used for ceilings and for firewood (Cordillera Schools Group Series, Volume I, 1987). Other hardwood species that can be found in muyongs or pinugos are molave, lauan, dapdap, yakal and yemane. Robusta coffee and other cash crops are also planted.

These data clearly show how the Ifugaos maintain plant diversity in managing their muyong. They have very specific ideas on tree-crop combination, which they base on the economic value of the trees, plants and crops, as well as on their religious uses (Codamon, 1990). Furthermore, the species traditionally planted in the muyong also serve to prevent soil erosion and maintain soil fertility.

Not just anyone is allowed entry into a muyong. Ifugao customary laws open the cultivation of the muyong to clan members only, as the muyong is considered to be clan- or family-owned. And only members of the family or clan which owns the muyong or pinugo can access its resources freely. Other members of the community which want to use the resources of a pinugo will first have to secure the permission of the head of the family or clan which owns it. Oftentimes, non-members of the clan are allowed to cut only branches of trees. But during times of need, like the death of a member of the village, access to lumber that is to be used to make the coffin of the deceased is granted.

If granted permission to enter the muyong, there is an unspoken understanding that one has the obligation to perform tasks that help maintain the muyong or pinugo. The person granted permission usually cleans up the place of debris, cuts weeds or any undesirable species that hampers the growth of the more valued plants and trees.

Tribal leaders say "the pinugo or muyong practice is a result of the strict act of tribal laws designed to guarantee protection of the forest environment" (Angelo and Reyes, 1987). Stealing firewood, for instance, from another person's pinugo is prohibited. The act **is** considered a most serious crime.

A study conducted by the Montanosa Research and Development Center has found that, "fire is recognized as a major controlling factor to muyung development." The indigenous people are careful to guard the muyong from fires. Strict penalties, such as the *multa* (heavy fines), are imposed on those responsible for the fire getting into the muyong. It is also said that violations of the law pertaining to the use and management of the pinugo or muyong were punished accordingly: a fine of two chickens as the minimum penalty; a pig or carabao as the medium penalty; and an entire ricefield and ostracism as

the maximum penalty. It was added, though, that the people seldom broke these laws because each understood the need for maintaining the forest cover (Ibid.)

In the past, before the introduction of the cash economy in the Cordillera, commercialization of the products that could be taken from the muyong was prohibited. This practice served to prevent the depletion of the muyong's resources and helped fruit-bearing trees reproduce naturally. But at present, especially in areas where fruit trees abound, cash crops and fruits from the trees have become an additional source of income for the family or clan which owns the muyong (Codamon, 1990). To prevent the depletion of the muyong's resources, the management and care of the area is given more time and attention. Eudes Enkiwe (1996), a native of Mayoyao, Ifugao and a pinugo practitioner-owner, listed some of the following indigenous techniques for the management and care of the muyong or pinugo. An interview with another native of Ifugao, as well as several other secondary materials, also claimed these techniques were being used by the people of Ifugao, though they used different terms for the methods:

(a) **Underbrushing:** The pinugo is frequently underbrushed, especially during the dry season, or as the need arises, in order to get rid of the prolific rono (Miscanthus chinenses), shrubs and other species of grass which compete for nutrient intake and prevent or control the growth of tree wildings. According to pinugo owners, a pinugo that is constantly cleaned and maintained also deters illegal cutters from entering it because a well-tended pinugo explicitly implies ownership of the area. Thus, this method is also a way **of** protecting the pinugo or muyong owners' interests.

(b) **Thinning** Thinning activities are employed on heavily populated or overcrowded portions of the pinugo through the cutting of mature trees, less robust or unhealthy trees and overcrowded coppice of cut trees. This method gives the favored trees (trees they value highly for lumber and fruit-bearing trees) the chance to grow faster and better.

(c) **Replenishment of sparsely populated areas:** Sparsely populated areas of the pinugo are replenished by planting other tree species, especially the premium ones taken from adjacent areas or from communal forests farther away from the settlement.

(d) **Removal of poisonous trees, shrubs and climbing vines:** Trees, shrubs and vines that have poisonous leaves, fruits, sap and hair are cut down and prevented from reproducing. This is done to protect its owners from being poisoned.

(e) **Pruning:** The owners of a pinugo also employ pruning. Excess branches of young and maturing trees are removed to facilitate their perfect growth and help the tree stem to straighten as it grows to maturity. Excess

branches of mature trees are also pruned to allow the young trees growing near them to grow better. These cut branches are piled and dried in one place and are used as firewood.

(0 **Selective cutting:** The people practice selective cutting of trees and branches. Only mature trees are cut and they cut only what is to be used immediately. "When in need of firewood for cooking or for customary rituals and house construction, pinugo owners cut only trees that are stunted or defective in their growth, and trees that are already in their deteriorating or dying stage. Young, straight and robust trees are never cut but are preserved and protected until [their] maturity" (Enkiwe, 1996). Likewise, mature trees that happen to be the only mother species found in that pinugo or muyong are not cut but are preserved so they can reproduce more.

Selective cutting is also applied because, the indigenous people say, there are tree species that are designated for special purposes. An example of this is the *gali-on* (also called ***galikkon),*** a type of berry which is used specifically for erecting the posts of their houses. The wood of the *gali-on* is also used for coffins and can thus be cut only in the event of a death within the family, clan or the community.

There are certain trees that cannot be cut in the dry season or at times when it is too windy. When these types of trees are cut, the Ifugao claim out of experience, the mere friction between the blade of an ax and the tree can easily cause fire. Thus, it is prescribed that the trees be cut only during the rainy season. During heavy rains, the people find it hard to set their fires, especially when it is time to cook; and using these trees as fuel becomes the most practical and safe alternative.

These very same methods of managing and caring for the privately-owned forests are also used by the indigenous people to care for communally-owned forests which they call *inalahan.* The inalahan is usually located far from the settlement and can be freely accessed by anyone from any tribe or village. Still, anyone who benefits from the resources of a certain area of the forest has the obligation to care for it. **As** such, people who go to the inalahan also brush off weeds, cut branches which hamper the growth of younger trees, remove debris and dry branches which are prone to fires, etc. The indigenous people do not plant new trees in the inalahan. This is the only difference between the people's management of a muyong or pinugo and their management of an inalahan.

Given the soundness of these methods and practices employed by the indigenous people of Ifugao for the conservation of our forests, many have recommended their application on a wider scale.

System of forest management in the Mountain Province

The Bontocs of Mountain Province have survived in their rugged and mountainous terrain by engaging in wet rice agriculture, slash-and-burn farming, horticulture, fishing, hunting, gathering, trading and several cottage industries like weaving. They also have their own system of forest conservation that is very similar to the muyong or pinugo of the Ifugaos. They call it ***lakon*** or *komunal* in the municipalities of Besao and Sagada.

Like the pinugos and muyongs, the lakons of Mountain Province are also owned by the family, clan or village. Not just anyone is permitted to access resources within the lakon. Conservation and management of the lakon, like that of the pinugo or the muyong, is also done through selective cutting, thinning, pruning, underbrushing and weeding. Sparsely populated portions of the lakon, like the muyong, are also planted with hardwood species and fruit-bearing trees.

But slight differences mark each tribe's system of forest management. In Bontoc, the irrigation of the people's rice terraces mainly comes from the Chico River. Thus, the lakon, unlike the muyong, is located nearer houses and not always above the rice terraces. For the Bontocs, any forested area can serve as their lakon, unlike the Ifugaos who must carefully choose the pinugo or muyong's location in consideration of its function as a water source for their rice terraces.

Another difference involves the system of transferring woodlot ownership from one generation to another. In Ifugao customary law, the first child in a nuclear family inherits the muyong of his or her father while the second child inherits that of the mother. In the Mountain Province, a lakon cannot be inherited by a single person. It is owned by the clan or what they call *sinpangapo*.

Also, unlike the pinugo or muyong which is bounded by neat rows of tall trees, in addition to the natural terrain, the boundaries of the lakon consist of earthmounds, canals, barbed-wire fencing or stone monuments set up in its comers. This has been the practice in more recent years, when the people find natural landmarks, like mountain ridges, rivers and creeks, inappropriate (Enkiwe, et al., 1998).

The Ifugaos use the strength of the multa to control the occurrence of fires. But in Bontoc, the people innovated what they call a "fireline". It ranges from five to ten meters wide and is set up in fire-prone areas. "The fireline **is** frequently patrolled during summer or the dry season to ensure the preservation of their traditionally managed forests" (Enkiwe, et al., 1998).

Woodlot management in other areas of the Cordillera

There are data which show a close relation between swidden farming and the development of woodlots in the Cordillera region. An example of this is the transformation of the Kalingas' *amak* into an *imung*. The amak is very similar to a swidden farm while the imung is the Kalinga version of a muyong or pinugo.

The Mangali tribe residing in the remote mountains of Kalinga Apayao maintains an amak, which is a patch of land, some as small as a quarter of a hectare. The amak is cropped with rootcrops, legumes and vegetables while the hedges are planted with both fruit and tree species. While the fruits and trees grow, it is slowly transformed into an imung.

The management of the imung rests primarily with a single family. Relatives of this family who want to cut trees in the imung must secure its permission first. As under the pinugo system, the cutting of trees in the imung is selective, especially if the imung is considered a watershed of a certain ricefield (Montanosa Research and Development Center, 1992).

The protection of "water-bearing" trees and plants

This practice was studied by the Montanosa Research and Development Center (MRDC), a non-governmental organization based in the Cordillera, in 1992. According to the study, the indigenous people's system of forest management includes the maintenance of certain tree species, like the *Ficus* spp., which the indigenous people consider as "water bearers". The presence of these trees, it is said, is indicative of an assured water supply.

Based on interviews conducted with farmers and on personal observation, the water-bearing trees have the following characteristics:

(a) The undergrowth is either damp or moist. In many instances, a spring can be found within the immediate vicinity.

(b) Many of these trees (especially the *Ficus* spp.) are associated with the presence of spirits, or *anitos* in the local language. This association of water-bearing trees with spiritual entities can be interpreted more in the context of the need to conserve these species. Through this association, fear of the unknown acts as a deterrent to cutting the valuable species.

(c) The outer bark of the trunk is usually watery. Some are characterized by a white, watery soot. Aside from this, many have a gum-like substance in the sap when cut.

(d) Many are found near creeks and streams.

(e) Most are shrubs or softwood. These observations, according to the MRDC, were similar in all areas of research. According to informants, the people have a way of identifying water-bearing plants by simply cutting a branch or a stem of the shrub. If water or sap drips, the people consider it a water bearer and do as their forefathers did – they protect the tree or shrub or refrain from cutting it.

Swidden farming in the Mountain Province

Rice is the main produce and staple food of the people of the Mountain Province. However, most can only afford one cropping per year, which cannot provide year-round food supply for a family or clan. Thus, the Bontocs find it practical to cultivate the mountains as swidden farms. They grow camote, legumes and vegetables in these areas to supplement their food requirements.

In the Philippines, this farming method is widely known as the ***kaingin*** system. It is also called the slash-and-bum type of agriculture because the indigenous people use fire, which they skillfully control, in order to clear a specific portion of the forest that they plan to cultivate.

In the early 80s, the Bureau of Forestry and Development, through Presidential Decree 705, banned the practice of the kaingin system, as this method was perceived to be destructive by many. But recent scientific and anthropological researches show the contrary – it actually helps in the conservation of the forests, if done properly.

According to Costales (1993), "prescribed burning is simply the controlled application of fire to wildland fuels in either a natural or modified state, and under specific environmental conditions which allow the fire to be confined to a pre-determined area and at the same time produce the intensity required to attain planned resource management objectives." Among the Bontocs, as well as other indigenous people of the Cordillera, this method has long been part of their indigenous knowledge and agricultural system. The people use the method for site preparation, for improving the growth of mature grasses, for hunting and to efficiently eliminate weeds and poisonous plants or vines that may harm them. Prescribed burning also improves soil fertility and makes it easier for them to shape their mountains into farms.

When the dry season is about to end, the Bontocs cut down small trees and underbrush in a certain portion of the mountain. The area is left to dry for a few days after which the large trees are either felled or left standing. Those that can be used as lumber are taken while small branches are cut and used for firewood or as treelines for climbing beans. After one to three weeks of drying, the cut area is burned. The fire does not spread out **of** the area because the edges have been cleared of grass and the natural cover of the adjacent portion

is too thick and green to catch fire. The site is prepared and as soon as it rains, planting starts (Cordillera Schools Group Series, Volume I, 1987).

There is not one swidden farm that is planted with a single crop. Crop diversity is a universal characteristic of the swidden farms of the Cordillera people. Beans, cow peas and other legumes are usually planted. The legumes, according to the indigenous people, help keep the soil together, preventing erosion. Camote and other rootcrops are also planted in separate swiddens. The native Igorots find camote a very good supplement to their diet. Furthermore, its leaves can also be mixed with rice bran and leftover food to feed their pigs with. The pigs' manure, which is rich in nutrients because the pigs are well fed, is brought to the ricefield to serve as fertilizer for their crops.

Small swiddens are also prepared for the planting of sugar cane. The people process this into a sugar-based wine called *basi*. Banana and other fruit trees are also planted around the swidden farm. These serve not only their need for fruits, but also as boundaries of the kaingin farm. Weeds are removed from the kaingin farms at least once a month. Harvesting takes place after four or five months. After the harvest period, the area is allowed to regrow its natural cover for a minimum of one to five years. Meanwhile, the people prepare for the next clearing in another spot (Cordillera Schools Group Series, Volume I, 1987).

The swidden farms of the Kalingas

The people of Kalinga Apayao province also consider their *payaw* or rice terraces as the main source of their staple food and the ***uma*** or swidden farm as a supplement. The uma, like the Bontocs', is planted with rootcrops, vegetables and beans, and sometimes to upland rice.

Like the people of the Mountain Province, the Kalingas have developed a system of knowledge on the proper undertaking of prescribed burning. The people choose to clear a specific part of the forest and cultivate it because forest soil is very rich in nutrients. Contrary to common perception, the indigenous people do not bum just any forest but carefully make a choice. The people are very much aware of the value of trees and know that the forest litter is what makes the soil fertile. Thus, they choose a portion where there is secondary growth and where fruit trees, lumber and other valuable plants will not be destroyed by the fire. The people are careful not to burn the entire forest by skillfully controlling the fire and limiting its spread to the small section which they want to cultivate (Angelo and Reyes, 1987).

This they do by first observing the behavior and general direction of the wind, the intensity of the sun and the humidity **of** the air. They also check whether the soil is extremely dry, in which case most decide not to push through

with the burning. Likewise, if the surrounding area is generally dry, the likelihood of fire spreading to other portions of the forest is high. Thus, in preparing the uma, utmost care, experience and an in-depth understanding of the natural forces at work are necessary. Controlling fire is not a simple task.

A study made by Olofson (1981) stated that "... firing requires a good deal of skill, and the precise evaluation of the micro-environmental and general climatic context to make certain that a thorough and even fertilized layer is achieved and that adjacent forest and dwellings are not accidentally damaged ... Burning among traditional shifting cultivators is controlled burning ..." After burning, the area is cleaned of debris, the soil is tilled, plots are formed, and boundaries are established. The uma is then planted with crops and periodically cleaned.

After harvest, the indigenous people make sure the land is given sufficient time to regenerate its fertility. Some leave the uma (kaingin) for five years; while in other areas, the land is allowed to lie fallow for as long as twenty years.

There is a system they call *apa*, which controls the management of swidden farms. The apa designates a swidden farm as "off-limits" and therefore cannot be cultivated after a misfortune (i.e. death) has befallen the family of a swidden farmer. The swidden farm is reopened for cultivation only after a period ranging from 10 to 20 years. It is believed this system has been established as one way of providing the land ample time to regenerate its lost nutrients (Montanosa Research and Development Center, 1992).

Meanwhile, the swidden farmer chooses another section or area of the forest to cultivate and only returns to the previous one when, based on his observations, the forest and its vegetation has been able to successfully reclaim the patched area (Angelo and Reyes, 1987).

Aside from the above-mentioned practices, other practices on forest management include the prohibition of swidden farms in watershed areas. Stiff fines are imposed on violators. For instance, a violator is obliged to sponsor a small feast (by butchering a pig or providing liquor for the family or clan which owns the woodlot). In Dandanac, Besao, Mountain Province, sanctions are levied not only on people who set fire to forest areas but also on people who happened to be in the vicinity during the onset of the fire but who did not help in putting out the fire.

In other areas where the *bodong* or peace pact is practiced, the provisions relative to the violation are applied.

4. DESCRIPTION OF THE INSTITUTION RESPONSIBLE AND ITS ORGANIZATIONAL ASPECTS

Ifugao social organization

The nuclear family is considered the smallest and most basic unit of the Ifugao social organization. Blood relations are the strongest bonds that keep the Ifugao together. "This primary bond is exemplified by collective responsibility associated with heredity, litigation and indemnity. The individual is responsible to his kinship group; in turn, it is responsible for the acts of its individual members. It also provides protection from outside aggression," according to a study on Ifugao social organization.

The study, done in 1987 and published by the Cordillera Schools Group, further said that the kinship group controls all the basic capital goods and sees to it that individual possession of ricelands and ritual heirlooms is seen as a trust on behalf of the kin group.

The Ifugao families, according to the study, live in small dispersed hamlets consisting of one to several dozens of houses. These settlements are always located near agriculturally-developed areas and constitute loosely-organized district communities.

In an Ifugao hamlet, individuals and families interrelate. Their interaction is determined by considerations of property and consanguinity. Several dozens of hamlets scattered near a clustered series of irrigated terraces and other land properties compose an average district which they call *himpuntonaun.* Districts become more closely bound to each other by sharing access to essential woodlots and irrigation water. Alignments of several districts often overlap but form the standpoint of parti-district. This forms a regional composition or a supra-district which is loosely clustered. In 1987, there were about 150 separate agricultural districts in Ifugao. These large clusters of districts are traditionally autonomous. The agricultural districts are the largest and the most functional territorial units in the environmental, cultural and social life of the Ifugaos (Cordillera Schools Group, 1987).

Bontoc social organization

In Bontoc, Mountain Province, each village is an autonomous political and economic agricultural unit. It is composed of nuclear families occupying single households. These villages have populations ranging from 600 to 3,000 inhabitants clustered on the slopes of the mountains, in small valleys or along the banks of the river, usually surrounded by their rice terraces. **A** research made by Prill-Brett in 1982 shows how "intense cooperation among the com-

munity members in a wide range of community activities has developed as a reciprocal cultural-ecological adaptation to their harsh environment."

"The Bontocs take pride in expressing themselves as one united community or *sinpangili.* The villagers are united on the basis of kinship ties, *ato* affiliations, historical experience against marauders, and a system of community rituals associated with agriculture, disasters and other matters affecting the entire populace."

Prior to colonization, each family was affiliated with one of several atos in a village and was represented by the eldest male in the household, most often the father. But before going to the ato, the male representative seeks the opinion of the women and other members of the household. Matters are discussed within the household and a consensus is arrived at, to be voiced out by the representative in the ato.

An ato is usually composed of six to eighteen members. Several atos exist in a single village. Some have eight atos, while others may have as many as eighteen atos in a single community. Interaction among different atos in a village is seen when burying each one's dead, when harvesting crops in the fields and when bartering. The village is the largest social group composed of different atos coalescing in times of trouble and during the performance of rituals and feasts (Cordillera Studies Group Series Volume I, 1987).

The ato is a politico-religious and social institution. It is an association of several families which Western scholars have interpreted as sections into which the village is divided. Through the ato, the Bontocs are able to consolidate themselves. The ato fosters unity by thrashing out conflicts among its members, discussing issues and problems affecting the entire community, settling disputes and issuing penalties, declaring wars with neighboring groups or tribes, suing for peace and accepting peace treaties, or holding peace pacts. The ato also provides assistance to families beset with problems.

Another important function of the ato is to sustain and preserve agricultural activities and calendar the rituals and rest days. In Guinaang, a village in the municipality of Bontoc, the atos form working groups composed of young men and women who work together in the fields from the time of soil preparation up to the harvest period.

A Council of Elders leads the ato. There is no single headman or chieftain. Decisions are arrived at by consensus, after long deliberation, recollections of past experiences and precedents. The elders are usually considered by the people to be wise men and experts in custom laws. They possess much experience and are thus seen to be in the best position to make the right decisions for the welfare of the villagers.

Kalinga social organization

The Kalinga villages are also composed of nuclear families, sometimes with an aged grandparent living in the same household. But according to studies made by the Cordillera Schools Group in 1987, the kinship circle is the basic social unit in the province. **A** kinship circle is composed of an individual, his or her siblings and first to third cousins, plus their ascendants up to the great grandparents and their descendants down to their great grandchildren, including their marriage families (Cordillera Schools Group, 1987).

A village consists of several kinship circles. It is the practice of the kinship group to take responsibility for the actions of its individual members. Likewise, whatever threatens the security of the kinship circle must be opposed by the individual member.

5. PROBLEMS OR OBSTACLES ENCOUNTERED AND HOW THEY WERE OVERCOME

The indigenous people of the Cordillera have one common problem: land. Their ancestral domain, whose richness they have preserved and nurtured for centuries, has always been a target of colonizers and big business who view the Cordillera as a resource base.

During the Spanish colonization, the indigenous people bravely and fiercely fought invaders in defense of their lands. They succeeded up to a certain extent and were able to at least preserve some of their lands and the socio-political institutions that controlled their indigenous knowledge and systems of agroforestry. During the American colonization, the indigenous peoples once again fought in defense of their land. But the Americans were interested not only in their forests (for their lumber), nor in their fertile soil, but in the gold beneath their lands. Many laws were passed and one by one, the indigenous people lost their ancestral lands. Accompanying the loss of their land was the corresponding loss of their valuable knowledge and systems of forest management, the uniqueness and ingenuity of their rice terraces, the fertility of their soil, the diversity of their plant and animal species, and the richness of life in the Cordillera region.

These problems persist up to the present. Many laws continue to disinherit the Igorots of their land. Their ways, traditions and beliefs continue to be dismissed as backward and unscientific. And much of their knowledge and systems have become part of the past we no longer have access to. Some Igorots have given up and have chosen to follow and practice more modern and technologically advanced practices of agriculture and forest management.

In effect, the Cordillera region's economy is becoming more and more

dependent on expensive foreign technology which, more often than not, is unsuited to local conditions. More and more of the Cordillera is being opened up and many indigenous people fear they may eventually lose control of their resources to local or foreign commercial interests. Members of different people's organizations who in April 1998 gathered in a workshop to discuss their situation cited the National Integrated Protected Areas System, the Certificate of Ancestral Land Claims/Certificate of Ancestral Domain Claims, the Northwestern Luzon Growth Quadrangle Program and the Philippine Mining Act of 1995 as policies which further disenfranchise the indigenous peoples of their lands and resources.

At present, mechanized bulk mining, dams and power plants that are to be built in the region spell not only the loss of the people's lands, the loss of indigenous knowledge, systems and practices, the loss of their life as a tribe, but also the destruction of the ecosystem.

As a response, many of the indigenous people are engaged in activities to defend their rights and interests, some through political activities, others through advocacy work, networking, research and lobbying. Meanwhile, a few Igorots still strive to practice their indigenous systems **of** agroforestry, among other indigenous practices.

6. EFFECTS OF THE PRACTICE/INNOVATIVE EXPERIENCE

The different agroforestry practices of the indigenous peoples of the Cordillera have helped sustain and preserve life **in** the region. They have provided an ample food supply to entire villages for generations. The rice terraces and pond fields were their primary sources of food. The swidden farms were their source of nutrient-rich vegetables and fruits, coffee, betel nuts, and leaves that they dry and weave into native handicrafts. The woodlots and forests are the habitat of wild animals whose meat they could eat. These also provided them with lumber for housing and home furnishings, firewood and fuel ***(saling)*** for cooking and medicinal herbs for healing their illnesses or for the performance of religious rituals. Other forest products included materials for their various arts and crafts like woodcarving and basket-weaving.

Their practice of forest and woodlot management also preserved mountain springs, creeks and rivers. This provided villages with continuous and abundant water supply for irrigation and for domestic use. The forests also protected their pond fields from erosion, in addition to serving as a natural shield against typhoons and strong winds.

Their practices preserved soil fertility, and maintained the lush forest cover of the region and the wealth of springs and rivers near settlement areas. In

general, they helped maintain biodiversity and the ecological balance in the region.

Because of their sound practices, the indigenous people have been able to survive in the rough and rugged mountains of the Gran Cordillera range for centuries. They have benefited from the natural resources of the region while at the same time sustaining its richness for future generations to continue using and nurturing.

7. SUITABILITY AND POSSIBILITY FOR UPSCALING

The Igorot's woodlot and forest management practice ought to be propagated and encouraged. Illegal logging, mining, and other development projects have had disastrous effects on the forests and their inhabitants. Thus, we are in need of a system as effective as those discussed in this paper. It is a system that not only protects the region's natural resources, but is also beneficial to both the forests and the forest dwellers.

Upscaling in terms of combining the different methods of different tribal peoples can and should be studied and developed. But customs and traditions, as well as the existence or non-existence of socio-political institutions that would ensure the effective and efficient implementation of these practices in different regions, should be taken into consideration.

However, the key issue is not the possibility of upscaling. It is the need to preserve the wealth of indigenous knowledge and systems on forest management. It is the need to preserve the indigenous socio-political institutions that ensure the implementation of such practices. For centuries, the colonizers' laws and policies have gradually eradicated these practices and destroyed indigenous systems and institutions. This continues up to the present. Different policies, projects and programs are proving to be obstacles to the continuity of such practices.

Thus, the need right now is to strengthen and empower the indigenous people's social organizations and revive old practices which are slowly diminishing. The need, right now, is to recognize and uphold the indigenous people's rights to their ancestral domain. The innovative practices discussed here are inevitably tied to this issue. The indigenous agroforestry systems of the people cannot be practiced if their rights are not recognized. Even if these practices are propagated and encouraged, the people will not practice them if they will not benefit from them.

Upscaling can only be feasible once this step is undertaken.

8. SIGNIFICANCE FOR (AND IMPACT ON) POLICY-MAKING

Centuries of practice have proven the soundness, viability and effectiveness of the indigenous practices of the peoples of the Cordillera. The wealth of the forests and other natural resources in the region can be attributed to the indigenous people, their way of living and their practices.

Several policy changes have occurred, which reflect acknowledgement of the contributions of the indigenous peoples. The government made pronouncements that duly recognized the role of indigenous communities in the preservation of the forests and other natural resources. The Philippine Strategy for Sustainable Development claims it shall promote community participation in natural resource management. Likewise, provisions in Republic Act No. 7586, also known as the National Integrated Protected Areas Systems (NIPAS) Law, and its implementing rules and regulations specify the participation of indigenous peoples and other "tenured migrants" in the management of protected areas for biodiversity conservation and sustainable development.

The Regional Resources Management Program of the Department of Environment and Natural Resources (DENR) also states, as one of its guiding principles, the recognition of indigenous systems and structures. In its newsletter, the DENR said "participatory planning and implementation shall be sensitive to the existence of indigenous institutional arrangements." "Indigenous knowledge and other customary arrangements shall be recognized and built upon where appropriate," the article further said. In addition to this, the off-farm agroforestry component of the Regional Resources Management Program of the DENR shall encourage people to build or restore mechanisms of community control over forest management. This, the government agency thinks, would ensure the maintenance of existing forest stands and the development of new ones.

Some non-government organizations of indigenous peoples in the Cordillera applaud these pronouncements of government agencies, while some are skeptical. There is concern that the NIPAS Law, instead of improving indigenous people's access to forest areas, is systematically easing them out of their ancestral lands.

The **NIPAS** Law designates a portion of a specific forest as its core; its inner periphery is classified as a buffer zone and the outer rim of the forest, an economic zone. Economic activities and human settlement are allowed only in the area which is classified as an economic zone.

According to the indigenous people, they are not allowed to enter the forest core and buffer zones and as such, may not utilize forest resources within this area. This is a concern which has been raised with respect to gov-

ernment policies on issues relating to ancestral lands and the region's resources. While there seems to be a consensus to protect and uphold the rights of indigenous peoples, how this is being put into action remains to be seen.

Other policies and programs that affect the land and forest resources of the people are being criticized by significant sections of the populace. Examples of these are the Mining Act of 1995, the Certificate of Ancestral Domain Claims/Certificate of Ancestral Land Claims, in addition to several government development projects (i.e. dams and infrastructure projects geared towards developing the tourism industry). These policies and programs, if analyzed, may be contradictory to the indigenous people's concepts on land, ownership, use and management of forest and other resources.

9. POSSIBILITY AND SCOPE OF TRANSFERRING TO OTHER COMMUNITIES OR COUNTRIES

The practice of rice terrace building and swidden farming can be transferred to other mountainous tropical regions within and outside the country. However, such a practice involves highly specialized techniques requiring intensive skills training. Moreover, the practice was handed down from generation to generation through oral means, physical demonstration and on-the-job training given to the young Igorots by their parents and grandparents. As such, there may be certain difficulties in transferring the practice to other regions and, more so, to other countries. An exposure to areas where it is practiced is necessary if one is interested in adopting these methods.

In addition, the indigenous socio-political institutions that ensured the systematic implementation of the practice, in addition to ensuring the safe conduct of these, will play a very crucial role in its transfer. The practice cannot be adopted without adopting certain aspects of the social organization that made it successful.

In contrast, the Igorots' practice of woodlot and forest management is simple and relatively easy to replicate. Its transfer to other communities within and outside the country is feasible. The practice is not only viable, it is sustainable, as long as it is supported by socio-political institutions that shall oversee its effective implementation.

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