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## Indigenous knowledge and practices for the sustainable management of Ifugao forests in Cordillera, Philippines

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### ABSTRACT

In the Philippines, many indigenous peoples such as the Ifugaos in Cordillera Mountains have continued to thrive in their relatively remote yet self-sufficient communities. Notwithstanding the transformations of many indigenous knowledge systems, practices that help promote forest sustainability have remained intact. This article aims to identify and describe key indigenous practices in the woodlot and watersheds collectively known as *muyong* in Ifugao communities. Data were obtained through focus group discussions and key informant interviews with selected local farmers in Kiangnan and Hungduan municipalities in Ifugao province. The recognition of the mutual connections between forests and rice terraces as a traditional belief is deeply ingrained in the heart and mind of Ifugaos. This tradition promotes sustainable forest management as expressed in their respect to customary laws pertaining to land rights, adoption of upland cultivation practices following soil and water conservation principles, stand management to promote ample supply of wood and fuel wood, and biodiversity protection. However, these knowledge systems are slowly disappearing due to the changing needs and interests of the indigenous peoples as well as the proliferation of government programmes to modernize farming technologies. Hence, the government, NGOs and other concerned stakeholders need to continuously support programmes in order to protect the aesthetic and traditional value of the Ifugao landscapes.

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## 1 Introduction

Indigenous knowledge can be broadly defined as the knowledge that an indigenous (local) community accumulates over generations of living in a particular environment (Ryser 2011). Indigenous forestry knowledge systems largely encompass local technologies, innovations, know-how, skills, practices and beliefs uniting local people to conserve forest resources and their cultural values. These have developed over thousands of years of direct human contact with the environment (Armstrong et al. 2006). Traditional knowledge often refers to a more generalized expression of knowledge associating a people or peoples with 'time-honored' ideas and practices associated with an individual or family (Ryser 2011). This knowledge is not limited to know-how, skills, innovations, practices, processes, learning and teaching, but also includes knowledge that is associated with biodiversity, traditional lifestyles and natural resources (WIPO 2012). While distinctions exist between the meanings of the terms, there is also sufficient overlap; hence, indigenous knowledge is often equated or used interchangeably with the term traditional knowledge, local knowledge, traditional forestry practices, indigenous practices and indigenous knowledge systems.

In the Philippines, about 14–17 million of the total population are indigenous peoples belonging to 110 ethno-linguistic groups mainly concentrated in Northern Luzon (33%) and Mindanao (61%), with few groups in the Visayas area (UNDP, 2010). Molintas (2004) underlined that many of these indigenous peoples can be found in remote forested and hilly uplands. Some have also stood their ground successfully and maintained a close link with their ancestral past.

Many indigenous peoples in the Philippines such as the Ifugaos in Cordillera Mountains continued to thrive in their relatively remote and yet self-sufficient communities. They were able to uphold their traditions as reflected in their music, dances, rituals, folklore, wood carving, agriculture and forestry practices. For instance, they believe that many endemic trees such as *Ficus spp.* are associated with spirits (anito), so they conserved them (Lim et al. 2012). The indigenous peoples also observe customary laws that lay the foundation for justice, unity and peace within their tribes.

However, the advent of colonial rules from the early 1700s to the late 1940s has led to the unabated influx of migrants into ancestral domains (Molintas 2004). This contributed to gradual changes in many local practices and beliefs. For instance are the ingress of Christian missionaries introducing new faith,

agricultural technologies to address food security, logging, construction of roads and other infrastructures for better mobility, and formal educational systems.

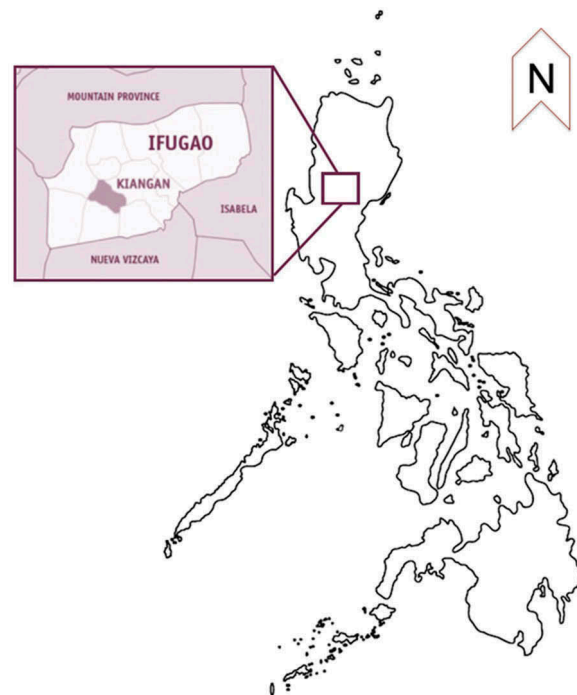
The different indigenous knowledge systems for natural resource management such as *muyong* and *ala-a-systems*<sup>1</sup> as practiced by the indigenous communities in the Cordillera, Philippines (i.e. Ifugaos, Isneg, Tingguians and Ikalahans) have been described in some studies (Dolinen 1995; Camacho et al. 2012). Notwithstanding the transformations of many indigenous knowledge systems in the Philippines, there remain intact traditional forestry practices that help promote sustainable forest management. However, there are limited studies on the relevance of these indigenous knowledge and practices in the sustainable management of the indigenous forests. This study was therefore conducted in order to identify and describe these indigenous knowledge and practices as in the case of the Ifugao communities. In particular, it described key indigenous practices in woodlot or watersheds or collectively known as *muyong* for the sustainable management of the Ifugao forests.

## 2 Methods

### 2.1 Study site

Ifugao Province is the home of the Ifugao tribe (Figure 1). It is one of the six provinces of Cordillera Administrative Region, situated in the north central Luzon island with an area of about 251,778 ha. It lies around a latitude of 16° 35' north and a longitude of 120° 50' east. The highest elevation is 2,523 metres above sea level (m.a.s.l.) with the rice terraces lying above 500 m.a.s.l. (UNESCO 2008). It is bounded by Magat River at the southeastern side and many of the upland areas are abode to gigantic dipterocarp and pine trees. Climate belongs to Type 3 (based on the country's climate type characterized by no very pronounced maximum rain period, with a short dry season lasting only from one to three months) with only a short dry season from January to April and along wet season from May to December. The average monthly rainfall is between 15 and 18.5 millimetres in areas with high elevation and between 27.43 and 30.18 millimetres in the lowland (DENR 2014).

The Ifugao province is well-known for its rice terraces that are inscribed in the UNESCO World Heritage Sites. Both the *muyongs* and rice terraces are the ancestral domains<sup>2</sup> of the Ifugaos under the provisions of Indigenous Peoples Rights Act (Republic Act 8371 1997). There are two



**Figure 1.** Location map of Ifugao Province, Cordillera, Philippines.

ethnolinguistic groups: *Ayangans* and *Tuwali* (DENR 2014). The *Ayangans* are common in the northeast and southwestern portion of the province while the *Tuwalis* live at the northwestern part. About 72% of the people are mainly engaged in farming for livelihood and employment. Ifugao province has 11 municipalities.

The study sites are the municipalities of Kiangnan and Hungduan where the Nagakadan Rice Terrace Cluster and Hapao Rice Terrace Cluster are located, respectively. These two rice terrace clusters are two among the World Heritage List of the United Nations Educational, Scientific and Cultural Organization in 1995 (UNESCO 2008). However, these terraces were reclassified to the World Heritage in Danger List in 2001 because of the 'human induced threats to the site and the need to concentrate national and international energies on short-term and long-term remedial and protective actions' (UNESCO 2008).

The municipality of Hungduan has a total land area of 22,789 ha with 11,403 ha or 48.48% forest; agricultural (mostly rice terraces) with an area of 705 ha or 3.09%, the rest are other uses (e.g. grasslands (30%), urban (17%), etc.) (CLUP Hungduan, Ifugao 1998–2007). However, the municipality of Kiangnan has a total area of 818 ha, with 70 ha devoted to rice farming. Other land uses in the area include timber/forest land, grassland, residential, etc. (SEP 2004).

By tradition, the land being managed by the Ifugaos do not have titles; hence, the rights to use

the land are community-based and passed on through inheritance. With the implementation of the Community-Based Forest Management Program in the country in 1995 (based on the Integrated Social Forestry Program in 1976), Certificates of Ancestral Domain Claim were issued providing security of tenure for 50 years, which in effect legitimized the presence of indigenous communities. A number of certificate of ancestral domain claim were awarded to the Ifugao, thus giving the right for the indigenous communities over their ancestral domain to occupy, develop and manage the land.

In 1997, the Indigenous Peoples' Rights Act was passed, which provided for an absolute Ancestral Domain Title promoting the practice of local peoples' customs and traditions in the development and management of their land. Hence, the Ifugaos have the rightful ownership of their *muyongs*.

## 2.2 Data collection

Focus group discussions (FGDs) and key informant interviews were conducted among 50 local farmers in Kiangnan and Hungduan municipalities of Ifugao Province (see the [appendix](#)). The respondents were distributed across the sites. The respondents were chosen using purposive sampling. Respondents of FGDs include farmers and village leaders in the area. Key informants include selected respondents from the Save the Ifugao Terraces Movement (NGO), and Municipal Environment and Natural Resources Office (local government agency), government officials from the Department of Environment and Natural Resources and Department of Agrarian Reform, tribal farmer leaders and officials from the local government units in the areas.

Common indigenous forestry practices that are being practiced in the two sites were identified from the survey. The farmers own and manage a woodlot known as *muyong* and rice paddies called *payoh* that form part of the Ifugao Rice Terraces. Extension

programmes of the government and non-government organizations that promote these traditional forest knowledge systems were also identified and described from the survey.

## 3 Results

### 3.1 *Muyong*

According to Butic and Ngidlo (2003), the Ifugao mountain ranges called *pugu* or *duntug* are predominantly covered by privately or clan-owned forests that are collectively termed as *muyong* (Figure 2). These watersheds provide ample water supply and nourishment to rice paddies and help minimize soil erosion.

*Muyongs* were generally described by the key informants as a traditional land-use zoning system that is usually placed along mountain peaks down to mid-slopes. These woodlots are also sources of their fuel wood, wood for house construction and various edible fruits such as the areca nut (*Areca catechu*). The Bagong Pagasa Foundation Inc. (as cited by Serrano & Cadaweng 2005) noted the sizes of *muyongs* often range from half to three hectares and have emerged as a land-use system because of the following possible reasons:

- (1) Ifugaos are aware of the relationship between forest and water table and hence retaining verdant cover at the hilltop will create a stable water source.
- (2) *Muyongs* are deemed major source of fuel wood for the local people.
- (3) Size of woodlots indicates economic status; hence the larger the *muyongs*, the greater the respect and recognition a clan or family will get from others.

*Muyong* was also described by the key informants as a buffer that delineates boundaries. Other land uses that are linked with *muyongs* are settlement or



**Figure 2.** A typical view of Ifugao Rice Terraces showing *muyong* (woodlot) and *payoh* (rice terraces).



*numboblavan*/boble, natural forest or *bilid*, grasslands called *buludna*, swidden farms or *uma* and, most importantly, rice terraces or *payoh*. Peripheral vegetation cover of *muyongs* is often cleared to indicate boundary delineations among farm owners. This helps avoid land property disputes. In some cases, *uma* and abandoned swiddens have converted to *muyongs* to enhance forest protection and production benefits.

### 3.2 Sustainable forestry practices

#### 3.2.1 Acquisition and transfer of land rights within the tribe

The traditional land ownership systems of Ifugao can be best viewed according to important customary policies and practices they observed. The respondents enumerated some of their traditional modes of acquiring land:

- a. *Boltan* (Inheritance). The early Ifugaos (or first Ifuago people with old Ifugao traditions before Western influence) give their children whatever they own such as *muyong*, land, livestock and houses, following primogeniture of 'rule of the first born'. The first born gets the biggest share, while the following children get less and less. The primogeniture rule also involves great responsibility for the eldest who receives the biggest portion of the inheritance. Such responsibility can be seen in the biggest contribution to expenses when the parents are sick or have died.
- b. *Gatang* or *hubli* (Purchase). This pertains to transfer of ownership in exchange of money from the seller to the buyer. Buyers are preferably neighbours or relatives who are native in the area.
- c. *Pallog* (Trading). Trading *muyong* with non-money commodities such as buffalo or a set of musical instrument (e.g. gongs).
- d. *Hakmo/Pidon/balal/hapoa* (mortgage). Mortgaging is done when a person receives money in exchange of a piece of land that he owns for a certain period of time.
- e. *Pun-anupan* (Hunting ground). In the old days, a powerful and feared individual or clan may claim exclusive rights over the hunting grounds.
- f. *Odonmi* (verbalized expression land ownership). One informs or reminds his/her relatives and neighbours of their ownership of the land by clarifying with them its boundaries. This is very important since cadastral maps are usually absent.

#### 3.2.2 Customary forest laws

Customary laws are reflections of rich traditions and beliefs that guide forest conservation. Key informants have identified some of these laws that are relevant to promoting the sustainable management of *muyongs*. These include the following:

- *Ficus* trees are not being harvested for timber and fuel wood since they help maintain sufficient groundwater supply for *muyongs* and *payoh*.
- Local people refrain from cutting century-old endemic trees such as dipterocarps because they believe that these trees harbour the spirits of their ancestors;
- Before cutting old trees, they conduct rituals to seek the permission of their ancestors. A shaman locally known as *mumbaki* directs the rituals.
- In the olden times, selection cutting was being practiced since there is a specific tree species that can be used for crafting rice god and constructing native houses, namely narra (*Pterocarpus indicus*).
- When a child is baptized, the parents plant four seedlings in their *muyong*, which indicates the giving of their blessings to their child.
- *Maid biyang umedi*, which means no trespassing in *muyong* areas, is being observed to avert illegal hunting of wild animals.

In the work of Serrano and Cadaweng (2005), remarkable customary laws are also identified. These are:

- One may gather dead branches as fuel wood from other *muyongs* even without permission from the owner. Such privilege is reciprocated by cleaning and tending the *muyong* as a form of payment for the fuel wood collected.
- If a tree is harvested, the person who gathered should replace it with two seedlings. The owner determines what tree he wants to give.
- If a person is caught stealing from *muyong*, he or she is brought to the tribal elders and will be severely reprimanded.
- To settle boundary conflicts, an ordeal called *had-daccan* – involving the two conflicting parties – is performed. Such an ordeal can be carried out through *butlong* or a wrestling match between the representatives of each party. It can also be resolved through *uggub* or long-throwing of reeds.

#### 3.2.3 Stand management

The Ifugaos observe traditional stand management practices that help sustain healthy forest cover in

*muyong* areas. These practices were described as vital in ensuring healthy forest stands:

- *Hikwatan* (Cleaning). An owner makes a habit to do some weeding to be able to help naturally regenerating trees to grow.
- *Tanomán* (Planting). Hardwood species are preferred by the owners since a big part of the Ifugao cultural identity is wood carving and house construction. Two of the most common reforestation species being planted nowadays are fast-growing species such as *Swietenia macrophylla* and *Gmelina arborea*. The local community also preferred planting local species such as *narra* (*Pterocarpus indicus*) and rain tree (*Samanea saman*), which are perhaps the most popular traditional construction and wood carving species. However, planting materials (e.g. *Samanea saman*, *Pterocarpus indicus*, *Lithocarpus spp.* and dipterocarps) are difficult to find; hence, there is a proliferation of exotic and fast-growing species (*Swietenia macrophylla* and *Gmelina arborea*) considering their short rotation period and widespread availability. No negative ecological impacts have been identified thus far regarding the use of exotic species.
- *Selective cutting*. Only the mature trees are cut for lumber and firewood based only on the need of the farmer. Crooked and diseased trees are preferred for fuel wood use while straight-bole is used for posts and wood carving. Tree species such as *alimit* and *tuwol* (both *Ficus spp.*) are spared since they were described as important water-conservers of *muyong*. Likewise, *balete trees* (*Ficus elastica* and *Ficus subcordata*) are also protected, as the local people believe that these trees shelter the spirits of the forest.
- *Hapi* (Felling direction). The woodfeller observes a felling direction or *hapi* to avoid damage to residual trees and nearby farms.
- *Bibiyo* (Warning signal). When cutting a tree, one shouts out the name of the tree so that the bad spirits leave and the people will not get hurt.

### 3.2.4 Upland cultivation

Swidden farming was described as the oldest form of agroforestry practice in Ifugao. Key informants described that swidden farms or *uma* are confined to areas that are not being used for *muyong* and rice terraces. Swidden farming practice involves clearing a patch of sloping grasslands and secondary forests. They plant sweet potato or corn for about two to five years, followed by a fallow period (*tahgwunon*) for another five years. The fallow system contributes to forest cover. Several indigenous swidden farming practices that help promote land stability and productivity were described:

- *Apuyan* (Burning). This practice is carried out in the late afternoon to avoid unwanted burning damages to adjacent areas since relative humidity is high and winds are usually slight. Burning may start from the side or from the top to the bottom of *kaingin* so that the fire movement will be slow.
- *Lotang* (Fencing). Fences are established along the peripheries of swidden farms. Materials can be branches obtained from vegetation clearing activities to avoid further cutting of trees.
- *Mungabut* (Weeding). Removal of unwanted grasses and shrubs is usually performed by women. During weeding, seedlings of indigenous trees such as *udyo* (*Pterocarpus indicus*), *amug-awon* (*Vitex parviflora*) and dipterocarps are retained.

### 3.2.5 Biodiversity and ecosystem services

Camacho et al. (2012) noted that *muyongs* are storehouses of biodiversity. There are about 264 species, mainly indigenous, belonging to 71 plant families that thrive in these conserved zones (Ngidlo 1998; Rondolo 2001). Among these, the family of *Euphorbiaceae* is the most abundant, followed by *Moraceae*, *Meliaceae*, *Leguminosae*, *Poaceae*, *Anacardiaceae* and *Rubiaceae*.

The key informants regarded the *muyong* system as a vital tradition that sustains healthy biodiversity. The informants practice an assisted natural regeneration (ANR) approach that enhances the growth of timber-oriented indigenous species such as dipterocarps, *Lithocarpus spp.* and pine tree (*Benguet pine*). Some ANR strategies adopted in the *muyong* include agroforestry, multiple cropping, enrichment planting and protection, efficient sicultural systems, whole-tree harvesting, and good wood-utilization practice (Butic & Ngidlo 2003).

Furthermore, wood carving, primarily the crafting of religious relics such as *bulul* (rice god), was identified as one of the primary benefits of practicing *muyong*. Ifugaos prefer *Samanea saman* for woodcrafts because it is fast growing, durable and has good resistance to fungus and termites.

In order to regulate timber harvesting, a *muyong* resources permit<sup>3</sup> is also being required by the government (through the Department of Environment and Natural Resources or DENR) before a farmer can cut and transport timber and timber products such as handicrafts. The guidelines governing the issuance of the *muyong* resources permit in the Province of Ifugao are contained under the DENR Memorandum Circular No. 96-02 issued in 1996, which include submission of the requirements (i.e. location and size of the *muyong* and the number of tree species planted, certificate of residency in the area and raw material requirement). There is also

**Table 1.** Perceived changes in land uses in relation to *muyong* system.

Land use	Perceived changes	Role of <i>muyong</i> system
Natural forest ( <i>bilid</i> )	Natural forest cover has increased since the early 1990s. This can be because of the abandonment of many swidden farms from their supposedly fallow stage.	Biodiversity has increased due to natural regeneration process. <i>Muyong</i> helps in providing seeds and regenerants for the nearby <i>bilid</i> .
Agroforestry ( <i>uma</i> )	Erosion-prone swidden farms have decreased and become part of the natural forests because of their long fallow period (20 years)	Lessened soil erosion in sloping swidden farms since diversified planting was adopted. <i>Alnus spp.</i> and <i>Calamus spp.</i> were introduced in <i>muyong</i> and <i>uma</i> .
Tree plantation	Land cover increased by as much as 10% since 1990 due to reforestation and introduction of coffee orchard.	Tree plantations were established in degraded/open <i>muyongs</i> . Multi-storey agroforestry technique was adopted to help create income from timber as well as non-timber resources such as fruits, vines, honey, coffee and others.
Natural grassland ( <i>buludna</i> )	Only occurs in small patches; did not change considerably since grasslands are mostly common along deep ravines and hilly mountainside.	None. Planting crops or timber is nearly impossible in these areas.
Settlement	With as much 1.7% annual population growth rate, settlement area has increased by about 30% since the 1990s.	Despite the increasing demand for settlement space, many <i>muyongs</i> have remained intact since they are communally owned. Settlement development was more common in areas along or nearby roads and town centre.
Rice fields ( <i>payoh</i> )	Not much change in cover since irrigation water supply is scarce, farmer numbers are decreasing, farmers have aged and capital requirement for planting has increased.	<i>Muyongs</i> are kept to provide water for the <i>payoh</i> especially during the dry months.

restriction on the allowable volume/number of species to be harvested as raw materials for livelihood projects. Likewise, maintenance of *muyong* is required according to the accepted practices and rules of the DENR. Moreover, clear cutting of tree species within the area is prohibited. This permit serves as a policy instrument to regulate timber extraction in *muyong* and *bilid*.

Table 1 further shows the focus group's perception of the importance of *muyong* vis-à-vis the perceived changes in land-use changes. The *muyong* system was perceived as vital in sustaining other land uses such as natural forest, agroforestry farms, tree plantations, grasslands and rice fields. Despite the demands for settlement and agricultural spaces to support a growing population, the perceived critical roles of *muyong* in soil and water conservation, regeneration, orchard and agroforestry livelihood source have helped the local community firmly keep their *muyongs* healthy.

### 3.2.6 Forest extension programmes

The inscription of Ifugao Rice Terraces in the UNESCO World Heritage List proved beneficial in attracting more agriculture and forestry programmes in Ifugao. One of these is the FAO's Globally Important Agricultural Heritage Sites (GIAHS nd) project, which aims to conserve the agricultural heritage systems and their significant biodiversity, associated landscapes, multiple goods and other ecosystem services. Key informants believe that the GIAHS project is valuable in protecting their *muyongs* and *payoh*. Specifically, they believe that this project can help in the following ways:

- Promote land and water conservation, rehabilitation and protection of the natural landscapes.
- Resolve ownership and policy issues impinging rice terraces and other GIAHS landscapes' conservation and management.
- Develop institutional support mechanisms for short-term and long-term sustainability and the adaptive management of GIAHS.
- Create awareness and recognition of customary institutions and forms of social organization that underpin the traditional agricultural systems through simultaneous educational, environmental, agricultural and rebuilding values programmes.
- Develop a niche for eco-agro-tourism industry.
- Develop a niche for marketing farm products.
- Develop alternative livelihood/ economic activities that are based on and compatible with the bio-physical, socio-economic and cultural characteristics.

In terms of indigenous knowledge promotion, the respondents lauded the beneficial outcomes of the government's *School of Living Traditions* (SLT) programme. This is an educational programme that aims at raising the awareness and appreciation of youths about their own traditional agriculture, music, dances, rituals, wood-carving and other arts. Learning modules were developed to better impart indigenous knowledge systems and practices in the formal schools, particularly primary and secondary education. The programme was made possible through the collaboration of National Commission for Culture and the Arts (NCAA), National Commission for Indigenous Peoples (NCIP), Department of Education (DepEd) and Save the Ifugao Terraces Movement (an NGO).

### 3.2.7 Perceived problems in the Ifugao forests

Two major threats to the integrity of *muyongs* and *payoh* were identified by the FGD participants. One is the transition from the traditional organic to inorganic farming methods, which has generated negative impacts on soil and water. The use of synthetic fertilizers was perceived to have degraded soil drainage

and fertility. Furthermore, the use of inorganic technology was believed to have incited infestation of earthworms and snails in *payoh*. Second, the abandonment of *muyongs* and terraces was underscored as a pressing concern. Participants have attributed this to declining interest in farming, as many prefer exploring other livelihood opportunities elsewhere for better income. Furthermore, children were also perceived to have a low interest in continuing their farming traditions as they desire to pursue other jobs after completing their studies.

## Conclusions

The *muyong* system is generally described as a practice that harmonizes the mutual connections between human and natural resources. Such a practice is deeply ingrained in the hearts and minds of Ifugaos. Local participants of the study emphasized the importance of the *muyong* system in promoting sustainable forest management as expressed in terms of 1) respect in customary laws and land rights; 2) revegetating previous swidden farms for soil and water conservation; 3) stand management for sufficient wood and fuel wood supply; and 4) biodiversity protection. Local participants also perceived the merits of increasing forest cover and protecting *Pterocarpus indicus*. However, a number of issues that threaten the *muyong* system were identified. These include the proliferation of inorganic farming technologies replacing the traditional ones, and the abandonment of rice fields and *muyongs* as farmers go elsewhere seeking other employment opportunities. A number of extension programmes such as the GIAHS and School of Living Traditions were regarded beneficial to promote *muyong* practice for the future generations of farmers.

## Notes

1. Ala-a-system is 'generally located on lands not cultivated as swidden but on lands too far to be covered by private claim or lands identified as hunting grounds', and used to gather products for household or farm use (Camacho et al. 2012).
2. Ancestral domains refer to 'all areas generally belonging to the Indigenous Cultural Communities/ Indigenous Peoples (ICCs/IPs) comprising of lands, inland waters, coastal areas, and natural resources therein, held under a claim of ownership, occupied or possessed by ICCs/IPs themselves or through their ancestors, communally or individually since time immemorial' as stipulated in the Republic Act 8371 or Indigenous Peoples Rights Act of 1997.
3. A *muyong* cutting permit is issued by the DENR to Ifugao individuals or families who intend to harvest timber from their respective *muyong*.

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No potential conflict of interest was reported by the authors.

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## Appendix

Guide Questions Used for Key Informants Interviews and Focus Group Discussions Activities on the Indigenous Knowledge and Practices for the Sustainable Management of Ifugao Forests in Cordillera, Philippines

### I. Criteria: Enabling condition for SFM

1. What are the customary laws, traditions, rituals related to conservation of *muyongs*?  
Wood, water, land, wildlife, mountain
2. How many households are still practicing traditional *muyong* today? (in percentage) (comparing before and after UNESCO inscription in 1995)  
What factors enhance/degrade traditional forest management? socio-economic, political, cultural?
3. Are there conflicts between customary and government policies and regulations on *muyong* management?
  - Tenure rights (occupancy)
  - Forest utilization rights (e.g. need to secure *muyong* permit)
  - Others.
4. Are there financial support (from UNESCO, gov't, NGOs) for farmers to conserve *muyong sites*? projects on watershed protection, sustainable agriculture, reforestation, etc. Are/were these sustainable?  
Do you consider external (UNESCO, DENR, National Commission for Indigenous Peoples, or NGOs) fundings, projects or programs helpful/harmful to promote/conserv *muyong practice/s*? Why?
  - Policies
  - Funds
  - Promotion of tourism
  - Promotion of forest conservation

5. Are there formal or non-formal organizations in the community who are in charge of *muyong*? If yes, what are these (customary groups or created by NGO or gov't for the project)

6. Who (group or individuals) have better access in major decision-making and planning activities in *muyongs* (cutting, boundary delineation)?

How do community 'members' participate in decision-making and planning activities on *muyong* (planning, utilization, monitoring and evaluations)?

Do you have *muyong* plans or documents?

7. Are there gender roles in *muyong* system? Please enumerate and describe?

8. Are there new technologies in *muyong* (externally introduced)? Do these technologies agree or disagree with traditional forestry/agricultural practices? (possible *before* and *after* UNESCO inscription comparison)

Are there modifications in traditional forest management practices to ensure food security and healthy forest cover?

### II. Forest extent and conditions

1. How do you perceive changes in forest cover? (increase or decrease, by how much in area or percentage)

- Area covered by natural forests (pine, rain tree, dipterocarp)
- Area covered by secondary forest (previously logged stands)
- Area covered by plantations (Gmelina, Mahogany planted)
- Area covered by grasses (cogon, runo and other shrublands)
- Settlement areas
- Area covered by terraces/rice paddies

### III. Ecosystem health

- Deforestation trend, increasing or decreasing? (before and after 1995); what traditional knowledge help conserve forests?

- Trend in areas covered with rice paddies (before and after 1995); what traditional knowledge help conserve paddies?

- Any incidence(s) of landslide, forest fire that can be attributed to mismanagement of forest?

- Do you think poor forest management will affect agricultural production and aesthetic value of the terraces? Please describe?

### IV. Forest production

- Perceived changes in timber yield (for wood carving, house construction etc.; please specify species) *possible before and after 1995 comparison*

- Perceived changes in non-timber yield (for fuel wood, medicine, etc.) *possible before and after 1995 comparison*

- Perceived changes in farm yield (rice: *tinawon* and other traditional varieties; non-traditional varieties) *possible before and after 1995 comparison*

- How do traditional knowledge affect the profitability/marketability of forest and non-forest products?

### V. Biological diversity

- Are there specific *muyong* practices that aim to promote habitat protection? Please describe

- Are there species (flora and fauna) dwindling in number?

- Do new and non-traditional technologies (forest and agriculture) affect biodiversity? How?

- Are there pests and diseases affecting *muyong sites*? *Possible before and after 1995 comparison*

## VI. Soil and water protection

- Water supply (decrease or increase)
- What traditional knowledge help sustain water supply
- Water quality (improve or degrade)
- What traditional knowledge help improve water quality
- Soil fertility (improve or degrade)
- What traditional knowledge help improve soil fertility

- What traditional knowledge help improve soil stability

## VII. Economic, social and cultural aspect

- Existence of mechanisms for equitable sharing of costs and benefits
- Existence of conflict resolution mechanisms for resolving disputes among stakeholders