



MARITES C. GERONIMO, MARIE GRACE S. CABANSAG & AGNES S. REYES

## Indigenous Utilization of Resources and Conservation Practices of the Agta of Lupigue, Ilagan City, Isabela, Philippines

**ABSTRACT:** Indigenous environmental management for sustainability is about the particularity of place, cultural, and spiritual values woven through knowledge of wildlife, forest trees, water, and land. Indigenous values associated with natural resources utilization and conservation might defy some scientific standards as they emphasize symbolic values to indigenous identity, customary law, and environmental philosophy. Symbolic values strengthen belief to indigenous knowledge, which are priceless and are handed down from one generation to the next through apprenticeship or direct participation. Beliefs and knowledge systems require an indigenous perspective to be relevant for use, so databases from every indigenous peoples group need to be appropriately designed for specific users. This study aimed to ascertain how the Agta of Lupigue, Ilagan City, Isabela in the Philippines utilize and conserve the natural resources in their domain. The ethnographic research was used to realize the purpose of this study. In-depth interview and participant observation were rendered to gather information. A review of documentary materials and readings was done to enrich the researchers' knowledge of the culture, knowledge systems, and practices of the respondents. Findings revealed that the Agta are consistent with their home-grown ways of using, protecting, and managing sustainably the ancestral lands and resources that have prevailed upon their identity as a people, despite the onset of science and technology. Indigenous environmental management for sustainability could be achieved by recognizing and understanding indigenous knowledge of natural resources.

**KEY WORDS:** Indigenous Peoples; Environmental Management; Cultural and Spiritual Values; Sustainability; Indigenous Knowledge of Natural Resources.

### INTRODUCTION

In the beginning of human civilization, the earth was abundant with economically valuable resources, such as forests, soils, coastal and inland waters, and wildlife that are essential for survival. These resources regenerate and even improve their resource values, but when misused or unreasonably

used can slowly lead to their depletion or loss (Painemilla *et al.* eds., 2010).

Nowadays, the effects of the depletion of natural resources are becoming more pronounced and so, cannot be ignored. The sustainable use and protection of these resources is of great importance to maintain an adequate supply for future generations.

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Otherwise, the survival of all life forms will become increasingly at stake. Natural resources are conserved for their biological, economic, and recreational values, as well as their natural beauty and importance to local cultures (Phillips ed., 1998).

What are the goals of resource conservation? Locally, according to GI (Grolier International) in 1995, the regeneration of soil, recycling of nutrients, and cleansing of waters and agricultural systems, coastal and fresh water systems, and forests; the preservation of genetic diversity; and the assurance that utilization of species and ecosystems, such as forests and grazing lands, is sustainable (GI, 1995).

Literature search reveal that many indigenous communities depend directly on natural ecological systems for their sustenance. In this context, Darrell Addison Posey *et al.* eds. (1999) and Marites C. Geronimo, Marie Grace S. Cabansag & Agnes S. Reyes (2016) stressed that biological diversity and natural ecosystems are closely linked to the economy, identity, cultural and spiritual values, as well as the social organization of IPs (Indigenous Peoples). Moreover, many of the landscapes, where IPs live is of extraordinary value, not only for their beauty and the ecosystem services they sustain, but also for their biodiversity. As such, IPs and their land holdings are a vital strategic component in regional and national conservation strategies (*cf* Posey *et al.* eds., 1999; and Geronimo, Cabansag & Reyes, 2016).

According to the CSO (Cultural Survival Organization), in 2014, the IPs are often thought of as the primary stewards of the planet's biological resources. Their ways of life and cosmo-visions have contributed to the protection of the natural environment on which they depend on. It is no coincidence that when the World Wildlife Fund listed the top 200 areas with the highest and most threatened bio-diversity, they found that 95 percent are on indigenous territories (CSO, 2014).

IPs have in-depth, varied, and locally rooted knowledge systems of the natural world; thus, they often inhabit territories that are rich in minerals and natural resources. And because ancestral lands and territories contain some 80% of the planet's biodiversity, IPs can play a

crucial role in the conservation and sustainable management of natural resources (IFAD, 2014). Moreover, IPs resolved to maintain and regenerate for the continuity of their ancestral environments and systems as distinctive peoples and communities (Russell *et al.* eds., 2015).

It is estimated that there are more than 370 million IPs spread across 70 countries worldwide (Malate, 2014). Practicing unique traditions, they retain social, cultural, economic, and political characteristics that are distinct from those of the dominant societies, in which they live. Spread across the world from the Arctic to the South Pacific, they are the descendants of those who inhabited a country or a geographical region at the time, when people of different cultures or ethnic origins arrived (Geronimo, Cabansag & Reyes, 2016).

According to UNPFII (United Nations Permanent Forum on Indigenous Issues), in 2014, the new arrivals later became dominant through conquest, occupation, settlement or other means (UNPFII, 2014). Majority of the world's IPs are found in Asia and they form about 5,000 distinct groups (CSO, 2014); and occupy about 20 percent of the earth's territories (IFAD, 2014).

The upland tribal groups are the third largest cultural group in the Philippines. The islands include more than 100 upland tribes, ranging in size from 100,000 to fewer than several hundred members. The members of the Aeta and Agta tribes are considered to be the indigenous people of the Philippines. Their communities are located mainly on northeastern Luzon (Steinberg, 2009).

Specifically, the Sierra Madre mountain ranges of northeast Luzon is home to the Agta, the first IPs to inhabit the Philippines and who are now being threatened of extinction (Bengwayan, 2007). The Agtas are hunter-gatherers who have inhabited the islands for at least 35,000 years; and today, around 9,000 Agta live along the coasts and in the tropical rainforest of the Sierra Madre Mountain Range (Reyes, 2012) which, with all the resources in it, has provided their basic needs: shelter, food, fuel, and medicine.

Moreover, the forest is their identity, their source of life. They believe that their ancestors were highly dependent on the forest in order to

survive. Thus, anything that upset these places where they coexist would certainly affect them also; hence, they would do everything in order to preserve it. According to Napoleon Buendicho, a Governor of the Quezon Tribal Council, as cited by Edna Estifania A. Co *et al.* eds. (2012) and L. Reyes (2012), that the Agtas are in the best position to act as stewards of the forests, because their sustenance comes from the forest and their culture deeply respects the forest and all life within it (A. Co *et al.* eds., 2012; and Reyes, 2012).

The HMDBMP (Highland Mapping Development and Biodiversity Management Project), in 2006, studied the sustainable, customary use of biological resources by highland communities in Northern Thailand. The study found out that traditional leaders build relationship between community people and natural resources, and biodiversity management by guiding their customary use of soil, water, forest animal, and plant resources. Villagers use natural resources in every aspect of their life through farming, hunting, and gathering (HMDBMP, 2006).

Similarly, results of the study conducted by R. Ocampo & R. Ocampo (2014), on the economic life of the Negritos of Luna, Apayao, showed that they engage in activities where they gather materials directly from nature, such as foraging, hunting, fishing, basket weaving, and upland farming (Ocampo & Ocampo, 2014).

One of the constructs on which this study is anchored is *Agenda 21*, the international action plan on sustainable development drawn from the UNCED (United Nations Conference on Environment & Development) in Rio de Janeiro, Brazil, in 1992, which recognizes the relationship of indigenous communities with their lands and natural resources therein (UNCED, 1992). Over many generations, IPs and their communities have developed holistic systems of resource utilization, which are considered sustainable and, may also, be scientific. Through these systems, they have continually transmitted their sustainable practices; hence, the need to strengthen their role in the implementation of environmentally sound and sustainable development (UNCED, 1992).

Furthermore, the IPs' dominion over their lands and resources that will enable them to preserve their institutions, cultures, and traditions; and will further their development in harmony with their aspirations and needs is explicit in the KD (Kimberly Declaration), in 2002, which says as follows:

*As peoples, we reaffirm our rights to self-determination and to own, control and manage our ancestral lands and territories, waters and other resources. Our lands and territories are at the core of our existence – we are the land and the land is us; we have a distinct spiritual and material relationship with our lands and territories, and they are inextricably linked to our survival and to the preservation and further development of our knowledge systems and cultures, conservation and sustainable use of biodiversity and ecosystem management (cited in Thotse, 2014).*

Correspondingly, CP (Congress of the Philippines), in 1997b, on “Republic Act No.8371, Chapter III, Sec. 7b: Right to Develop Lands and Natural Resources”, states in part, as follows:

*[...] right to develop, control and use lands and territories traditionally occupied, owned, or used; to manage and conserve natural resources within the territories and uphold the responsibilities for future generations; to benefit and share the profits from allocation and utilization of the natural resources found therein: the right to negotiate the terms and conditions for the exploration of natural resources in the areas for the purpose of ensuring ecological, environmental protection and the conservation measures (CP, 1997b).*

In addition, NCIP (National Commission on Indigenous People), in 2012a, on “NCIP Administrative Order No.2, Series of 2012, Article 1, Sec. 3e, on Sustainable Development”, stipulates as follows:

*[...] the ICCs/IPs, through their IPS, occupying their ancestral domain shall preserve, restore, and maintain a balance ecology in the ancestral domain by protecting the flora and fauna, watershed areas, and other reserves and to actively initiate, undertake and participate in the reforestation of denuded areas and other development programs and projects subject to just and reasonable remuneration (NCIP, 2012a).*

In consideration of the foregoing legitimate bases, the researchers, on common ground, deemed it imperative to document the traditional use of natural resources *vis-à-vis* the conservation practices of the Agta of Lupigue,



Ilagan City, Isabela that will serve as reference in the preservation and diffusion of their unique practices that support environmental sustainability. Figure 1 shows the research paradigm, which guided the flow of the study.

This study sought to answer the following questions: (1) How do the Agta utilize the following resources: wildlife, trees/plants, inland waters, and land?; (2) What are the indigenous conservation practices of the Agta in terms of their utilization of the aforementioned resources?; and (3) What are the implications of the indigenous utilization of resources and conservation practices of the Agta on: environmental sustainability, and Indigenous Peoples education?

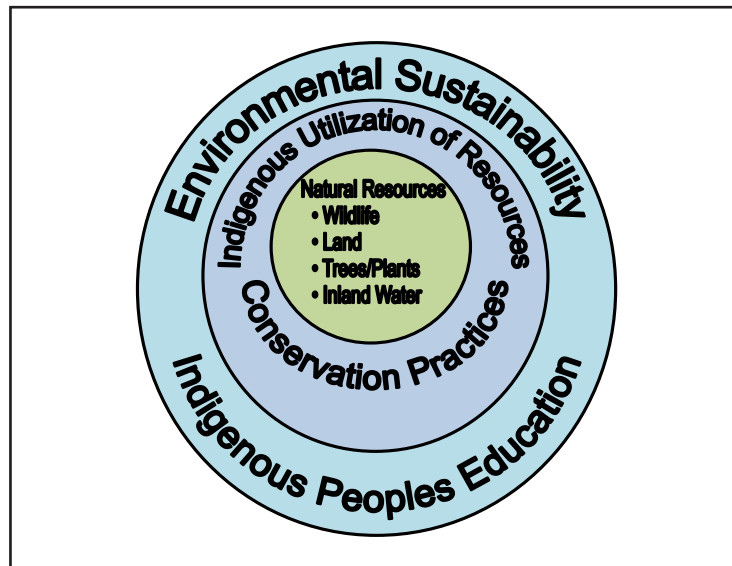


Figure 1:  
The Research Paradigm

## METHOD

**Research Design.** This study is ethnographic. Interview and observation were used in gathering the needed data. The manner on how the Agta used the identified resources and their way of preserving and conserving them were described as told by the respondents themselves. According to J.R. Fraenkel & N.E. Wallen (2006), the emphasis in ethnographic research is on documenting or portraying the everyday experiences of individuals by observing and interviewing them and relevant others (Fraenkel & Wallen, 2006).

**Respondents.** All the Agta male and female adults in the small village of Lupigue, Ilagan City, Isabela were considered as respondents of this study. Since they are semi-nomadic, they stay along the Sierra Madre Mountains in an area they call Sulimanan; and at some point in time, move down the lowland through the Abuan River.

**Locale of the Study.** Data-gathering was done in a small village at Lupigue, Ilagan City, Isabela, where the Agta families stay when they are in the lowland. Lupigue (Cabisera 10) is one of the Cabiseras of Hacienda San Antonio in Ilagan City, Isabela. Figure 2 shows the map of the City of Ilagan. The research locale is highlighted.

**Instruments.** Firstly, on Documentary

Analysis. An intensive review of documentary materials and readings about the Agta was done to enrich the researchers' knowledge of the respondents and their culture, knowledge systems, and practices.

Secondly, on Interview Guide. The researchers used an interview guide to investigate how the respondents use and conserve their resources. The interview was conducted during the day when the respondents were available. The interview guide included varied questions relevant to the study. Unstructured interview was used to elicit responses from the respondents. Questions were asked in Ilocano, since this dialect is spoken with ease by both the researchers and the respondents. The interviews were done in the most informal and unobstructed manner so as to keep the respondents at ease and unperturbed.

Thirdly, on Observation and Immersion. As respondents of the study, the Agta of Lupigue, Ilagan City, Isabela were the focus of intense observation. The researchers were intent participant-observers. The personal contacts enabled them to elicit the first hand information and genuine observations on how the Agta utilize and conserve their resources.

**Data Gathering Procedure.** Initially, an application to conduct the research and payment of fees was done at the NCIP

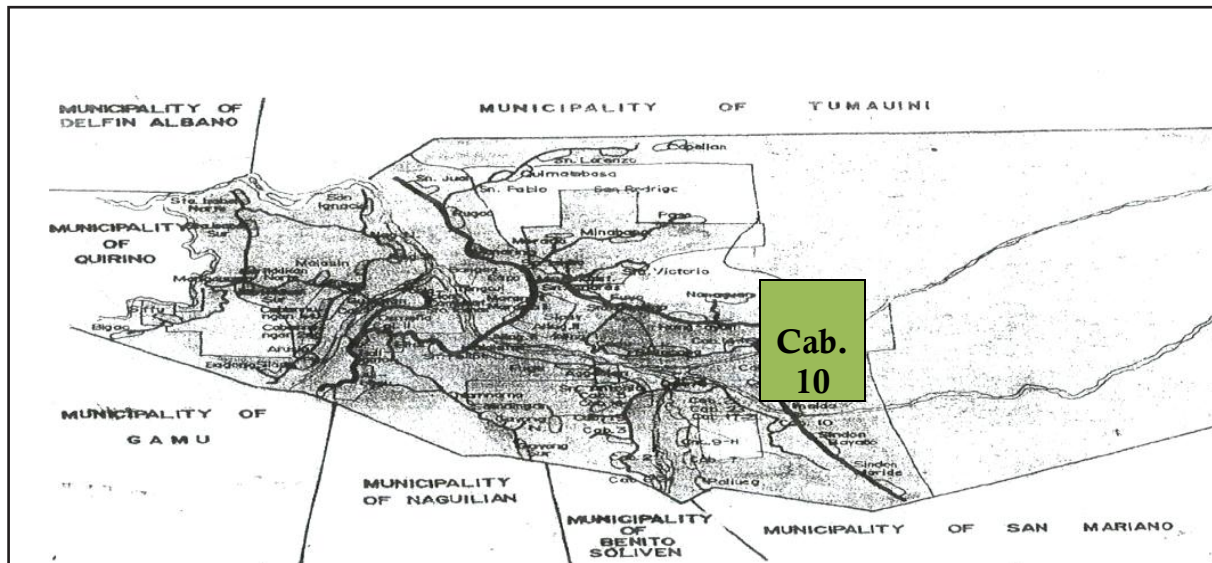


Figure 2:  
Map of Ilagan City

(National Commission on Indigenous People) Regional Office. After which the application cum proposal was reviewed and evaluated. The IKSP (Indigenous Knowledge Systems and Practices) team was formed to facilitate the proceedings provided in the guidelines. This was followed by the formulation of WFP (Work and Financial Plan) by the researchers and the IKSP team.

Upon approval of the WFP, the IKSP team scheduled the conference and disclosure between the community members and the researcher-applicants. Then, the report was submitted to the NCIP Regional Office for the issuance of the Certification Precondition (CP, 1997a; Tuyor *et al.*, 2007; and NICP, 2012b).

Before the study was conducted, a well-planned optical inspection of the research locale was done by the researchers. Series of interviews with immersion were conducted to document the resource utilization and conservation practices of the Agta. Part of the immersion was the 8-hours travel by wooden Bancas to Sulimanan, a place along the Sierra Madre Mountains where the Agta do foraging, hunting, fishing, planting, and engage in charcoal making.

The researchers also took photographs of the Agta's activities. After completing the write up of the study, the researchers presented their output to the community for validation. The

certificate of validation was issued before the submission of output to the NCIP offices. See the copy of certificate, pages 1 and 2.

**Data Analysis.** The data gathered were presented and analyzed in a descriptive-narrative form supported by some photographs.

## RESULTS AND DISCUSSION

**On Indigenous Utilization of Resources.** How do the Agta utilize the following resources: wildlife, trees/plants, inland waters, and land are following here:

**First, Wildlife.** A common sight in an uninhabited area in Sulimanan is the presence of wild pig or boar (*alingo*). Known for their dexterity in hunting, the Agta trap the *alingo* by using a *silo*, a plant stem of a forest plant formed into a circle, which is placed over the neck of the animal and then pulled to tighten.

In some instances, the Agta pursue the animal with the use of a self-made shot gun or by means of a *pana*, also called *pika*, a two-pronged, self-made arrow, and bow made from iron scrap materials. Sometimes, a dog is freed to chase an *alingo*, which eventually gives up after being bitten by the dog. The *alingo* is hunted for food, because of its meat.

Just like the wild pig, the deer (*ugsa*) is also trapped by a *silo* or shot by the *pana*, primarily for food. However, after the *ugsa* is slaughtered, the other body parts which are not intended for



OFFICE OF THE PRESIDENT  
NATIONAL COMMISSION ON INDIGENOUS PEOPLES  
ISABELA PROVINCIAL OFFICE  
2<sup>nd</sup> Floor, Old Provincial Capitol Bldg.  
Ilagan City, Isabela

## CERTIFICATE OF VALIDATION

**THIS IS TO CERTIFY that a validation of the research/documentation**  
*ITO AY PAGPAPATUNAY na ang pagpapabisa ng resulta ng pananaliksik / pagsusulat*

output was conducted on JANUARY 14, 2015 at CABISERA ID, LUPIGUE, ILAGAN CITY  
*ay naganap noong 14 - 14 NG ENERO 2015 sa CABISERA ID, LUPIGUE, ILAGAN CITY*

where MARIE GRACE S. CABANSAG presented the translated version of the  
*kung saan ipinaliwanag ni MARIE GRACE S. CABANSAG ang naisalin na pahayag ng*

**research output, including his/her findings and recommendations.**  
*nasabing resulta ng pananaliksik, kasama ang kanyang mga natuklasan at mga mungkahi.*

**We find the information contained therein to be factual and properly**  
*Aming natuklasan na ang mga kaalaman na nakalagay doon ay base sa katotohanan at nasa wastong*  
**reflective of our customs, traditions, beliefs, and IKSPs. We have also agreed**  
*paglalarawan ng aming kaugalian, tradisyon, paniniwala at IKSPs. Kami ay nagkasundo rin at*  
**and are satisfied with the content, extent and manner of presentation of the**  
*nasiyahan sa nilalaman, sa lawak, at paraan ng pagpapahayag ng mga*  
**information and knowledge that may be published or communicated by the**  
*impormasyon at kaalaman na maaaring ilathala o ipahayag ni MARIE GRACE S. CABANSAG*  
**(researcher).**

Done this 14<sup>th</sup> day of JANUARY, 2015 sa CAB. ID, LUPIGUE, ILAGAN CITY.  
*Isinagawa ngayong ika- 14 ng ENERO, 2015 sa CAB. ID, LUPIGUE, ILAGAN CITY.*

NAME  
(Pangalan)













SIGNATURE / RIGHT THUMBMARK  
(Lagda / Kanang Hinlalaki)

1. MILDK ASUNCION

2. EDDIE PAGUIRIGAN

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Copy of Certificate, Page 1

4.	MELY ALVAREZ	
5.	NDLI ALVAREZ	
6.	CIUG ALVAREZ	
7.	ELMA CRISOSTOMO	
8.	LOLITA MAGUDANG	
9.	IVY CABALDO	IVY
10.	ODESSA PASCUA	Odessa
11.	MICHELLE CALLE	
12.	RICHELLE IMPIEL	Richelle
13.	GELMA ASUNCION	
14.	ANALYN ALVAREZ	
15.	GINA ASUNCION	
16.	BANUG ALVAREZ	
17.	FREDYLYN PAGUIRIGAN	
18.	SABBITA CABALDO	
19.	GIRLIE ALVAREZ	
20.	BARKES ALVAREZ	
21.	ASEL ALVAREZ	
22.	MARY JOY GALASINAO	
23.	MARLON CARASACAS	
24.	RODEL PANATIC	Rodel

2/2



consumption are left to flow in the river or may be eaten by a monitor lizard (*banyas*). Moreover, when the cogon grasses are plentiful, this would be the chance for the *ugsa* to feed on the grass.

The monkey *sunggo* is also hunted with an air gun or shotgun only when needed as medicine. The Agta believe that the blood of a *sunggo* could cure malaria. Sometimes, its meat is also eaten by them.

Fowls such as native chicken (*abuyog*) and big bird (*kalaw*) are both hunted for their meat by the Agta. Birds are less preferred than native chickens, so they are only considered for food when they are accidentally caught by the trap called *silo*. When they are able to get more than what they actually need the spare *abuyogs* are sold in the market.

Similarly, the meat of the monitor lizard (*banyas*) and snake (*beklat*) are food to the Agta, while the bile of the *beklat* is soaked in white wine or oftentimes in a glass of hot water and drunk to relieve stomach ache (interview with Respondent A, 15/1/2015).

**Second, Trees/Plants.** Trees abound in the Sierra Madre Mountains' thick forest. Parts of fallen trees, such as branches and twigs, are cut into pieces and are used as fuel. The slim, sturdy trunks of young trees are cut into poles and are used to hold (*pagtik-kin*) the boat (*bangka*) in place or used to move it away from a boulder or barrier. Some parts are shaped into paddles (*pag-gaod* or *paluga*). The sturdier, mature trunks are cut into slabs and assembled into *bangkas*. See photo 1.

Parts of trees that float along the river (driftwood) are gathered by the Agta. Those that are shaped by the water are used as home décor, which are fixed on the wall of their house in the village and are used to hang hats. The big ones are dug along the river bank and are used to anchor their *bangkas*. See photo 2.



**Photo 1:**  
The Boat (*Bangka*)



**Photo 2:**  
Parts of trees that float along the river (driftwood) are gathered by the Agta.



**Photo 3:**  
The Small Pieces of Wood are Placed in Shallow Dug Holes on the Ground, Where They are Burned into Charcoal



The small pieces of wood are placed in shallow dug holes on the ground, where they are burned into charcoal. See photo 3. These are put into sacks and are transported to the nearest local market for sale.

On the other hand, by order or with permission from the municipal officials, the big trees are cut by a chainsaw into lumber for construction purposes. However, before this is done, a ritual is performed by the elders and a prayer is said.

One common source of food for the Agta is the *agal*, also called *anibong*, a palm tree. After the bark of its trunk is removed, the inner part is cut into pieces and pressed to remove the sap. Then, the collected sap is dried under the sun, pound into flour-like texture and fried. This is considered as a substitute for rice.

The Agta also gather fruits of trees from the forest for food. Mangoes (*mangga ti bakir*), rambutan, banana (*saba*), and cassava (*kamotengkahoy*) abound in the forest and are gathered as food. The rattan *uway* vine bears fruit (*alindayag*), which is yellow to brown in color, with a sour taste, and a thorny stem. The *uway* stem is a common raw material woven into baskets (*baki*), where harvested crops are gathered. The *baki* is also used by hens when laying their eggs until hatching time or until the chicks are ready to be tagged along by their mother.

Rattan is also made into backpack *pasiking* with a detachable basket *bigasan* used to carry clothes, when an Agta goes for a travel. The *pasiking* is also used to carry their hunt and to keep their food when its basket is detached. The *bigasan* is made from a palm plant *silag*. When this basket is detached from the *pasiking*, it is used to store rice or corn (interview with Respondent B, 20/1/2015).

**Third, Inland Waters.** The river is a basic natural resource of the Agta. It is the main source of drinking water. It is also used for cooking and washing. Moreover, they bathe themselves and wash their clothes in the river. As source of food, the river is home to a variety of fish, such as *tilapia*, freshwater eel (*igat*), some species of mullet, President's fish (*ikan*), *banak*, *ludong*, *kurilao*, and clams (*bukasit*



**Photo 4:**

Another Kind of Net (*Bukatot* or *Karwas*) Made of Old

and *agurong*). The fish are usually out at night to hunt for food.

The home-made arrow (*pana*) is usually used to catch fish. It is made of a sharpened nail, a piece of rod and rubber. The Agta wear goggles (*antipara*) and bring along with them improvised torch or lamp, when they go out fishing at night. Aside from the *pana*, the net (*sigay*) is also used. Another kind of net (*bukatot* or *karwas*) made of old, worn-out mosquito net with smaller holes is also utilized for trapping small fish, including snake that would enter the trap (interview with Respondent C, 25/1/2015). See photo 4.

**Fourth, Land.** Arable land along the mountains is planted with corn or rice for food and for barter. Harvested rices are put into sacks and are brought to the nearest locality for milling. Sometimes, the wooden pestle (*al-o*) is also used to pound the rice. After harvesting corn, the area is cleared of weeds manually of the stalks and leaves and these are burned to prepare the land for the next planting season. Part of their harvest is usually bartered to the kind of seeds, which are ideal for planting. Vegetables, such as *monggo* (*balatong*), string beans (*sitaw*), squash (*karabasa*), *parda*, and jute (*saluyut*) are also planted as source of food.

Other land resources include cogon (*pan-aw*), *talahib* or *sikal*, and bamboo (*mara-kawayan*). After harvesting, these are hanged to dry and then stored in the ceilings of their houses for future use.

The way the Agta of Lupigue, Ilagan,

Isabela utilize resources is similar to the Agta of Mt. Iraga in the Bicol Region, as noted by Global Pinoy (2014) in that, they use pointed sticks called *galud* to kill birds, wild deer, monkeys, and wild pigs. Hunting, fishing, and farming are also their traditional means of livelihood, while charcoal making is considered a seasonal job (Pinoy, 2014).

In addition, the Bantu and Koisian peoples of Africa practice hunting as a means of subsistence. Moreover, pastoralists in the new world and the people of Trobiand Islands in Guinea practice *wasi*, an exchange of produce or balanced reciprocity (Peoples & Bailey, 1997), as well as the Negritos of Luna, Apayao gather plants for consumption or sold to the local market to provide them income for their daily subsistence as do the Agta of Lupigue, Ilagan City, Isabela (Ocampo & Ocampo, 2014).

Among the foraging Agta of the Sierra Madre in the Philippines, women make an important economic contribution to their households through hunting (Estioko-Griffin & Griffin, 1985; Ember & Ember, 1992; and Nanda & Warms, 2002). Agta men tend to hunt alone, stalking pigs, deer, and monkeys with their bows and arrows. Women hunt in groups, with men or with other women, using dogs to drive the animals and killing them with long knives or bows and arrows (interview with Respondent D, 30/1/2015).

**On the Conservation Practices.** What are the indigenous conservation practices of the Agta in terms of their utilization of the aforementioned resources?

**First, Wildlife.** The Agta practice selective hunting. They leave the young, pregnant, and female *alingo* behind to continue the perpetuation of the specie. In an attempt to use the *silo* to trap *alingo*, the Agta peg a maximum of 10 sticks only. Young animals that get caught in the trap accidentally are brought home by the Agta to take care of until they get tamed and grow mature. If they are able to trap more than what they need, they would sell the excess in the local market or preserve the meat by drying under the sun.

Another way of preserving the meat of



**Photo 5:**  
The *Sahab*

*alingo* or *ugsa*, fish, and chicken is by drying over fire or smoke. The *sahab* is an improvised indigenous material, where animal products are placed when drying. The *sahab* looks like this in the photo 5.

This is made of twigs or small branches tied together forming a flat tray attached to three small posts, like a tripod. Below it is firewood which is burned when drying begins. The animal meat is then pre-cooked until dry over low fire. This will make the animal products last for a longer period of time. However, these products spoil easily during the rainy or cold season.

The dried animal products *pindang* are usually stored for future consumption in makeshift baskets *dagyan*, which are made of *uway* or rattan. See photo 6.

The Agta usually barter their products with tobacco, rice, salt, and other basic commodities. Moreover, the antlers and teeth of *ugsa* (deer) are sold for as much as one hundred fifty Pesos (P 150). The jawbones of *ugsa* with well aligned teeth are kept for a belief that by keeping them, they bring good luck and harmonious relationship with family members (interview with Respondent E, 5/2/2015).

**Second, Inland Water.** Moreover, the Agta also practice selective fishing. When they plunge into the river, a number of fish would get near them, but they would catch only those fit for consumption. Their fishing technique uses weeds *lidda* or *sikal* that float in water and drawn by the river current. They believe that once the fish get tired swimming, while



avoiding the chasing weeds, catching the fish becomes easier.

This natural technique of fishing could save the river from destruction compared with the use of harmful chemicals by modern fishermen. Since the river is the main source of water for drinking and for cooking, it is kept free from floating dung and other waste products (interview with Respondent F, 10/2/2015).

**Third, Land.** The ancestral lands of the Agta are maintained for their natural soil fertility by allowing stalks of corn or rice to decay in the farmland to serve as fertilizer. Farm pests like rats are treated with kindness, so they will not destroy their crops as they believe that once they get hurt, they become destructive.

The Agta avoids the use of BT (*Bacillus Thuringensis*) corn seeds in their farm to avoid the use of synthetic fertilizers and harmful pesticides as would farmers in the village practice. They dislike the yellow corn seed for planting for its expensive farm input requirements. The integrity of the topsoil is kept by using only bolo and stick in planting (interview with Respondent G, 15/2/2015).

**Fourth, Trees/Plants.** Only small pieces of wood or wood drifting from the river are gathered for fuel or sold at the local market. The *uway* vine is made into chairs and baskets, and these are also sold in the local markets or bartered.

Among the Agta, the forest is considered as their food storage. However, food is not stored, so there is no need to collect more than what is needed for the day. A tribe member should only get what he needs for his family. If a catch is more than enough for a family, the tribe member must share it with others (interview with Respondent H, 20/2/2015).

There are limits to areas to cultivate, where designated areas for the cutting down of trees is allowed. If there are only few remaining trees of a certain kind, these would never be cut down until they have multiplied and grown in sufficient numbers. In addition to this, there are designated months for hunting, as the tribe believes that animals should be allowed



**Photo 6:**  
The *Dagyan*

to grow properly and increase in numbers. Pregnant animals are never hunted. The same is true with fishing (Calzado, 2014).

The conservation practices of the Agta on the use of non-economic goods are environment friendly. Thus, their ways of conserving ensure sustainability.

**On Implications of the Indigenous Utilization of Resources and Conservation Practices on Environmental Sustainability and Indigenous Peoples Education.** The indigenous management systems on the utilization and conservation of resources by the Agta offer insights into how contemporary practices on the harvest of wild foods might be managed more sustainably. The indigenous knowledge and practices can give long-term perspectives on trends in wildlife populations, the season to hunt for food indicate the period of wildlife abundance, while the need to hunt only for medicine means the resource



is conserved, due to its decreasing number (Painemilla *et al.* eds., 2010).

The areas of the forest where the IPs (Indigenous Peoples) hunt and collect food reveal the past and current distributions of forest resources as well as the associations between different species in the wild. The throwing of weeds on flowing water is used to spot the location of big fish, a distinct strategy of Agta that illustrates knowledge on symbiotic relationships among organisms (Geronimo, Cabansag & Reyes, 2016).

Partnership of government agencies and the education sector in incorporating traditional knowledge into contemporary wildlife management regimes and counter the negative effects of technological revolution that have greatly expanded the threats to customary harvests of wildlife for exotic foods is indispensable.

Sustainable environment anchored on wise utilization and conservation of resources is impeccable among the IPs, their effective participation in conservation and in protecting and managing biodiversity of natural resources would result in more comprehensive and cost effective conservation and management of biodiversity worldwide. The IPs are a source of knowledge to the many solutions that will be needed to avoid environmental degradation or to ameliorate sustainable environment (Tuyor *et al.*, 2007; and Painemilla *et al.* eds., 2010).

The core aspect of sustainability of natural resources for the Agta is the continuity of supply for their food and medicine (Geronimo, Cabansag & Reyes, 2016). It is only through knowledge application to day to day life experiences that indigenous knowledge will retain its relevance and be perpetuated by future generations. The transmission of knowledge on resource utilization and conservation is through apprenticeship and the early participation of the young in the natural courses of their life, both in the village and in the mountains, has taught them of being mindful for seasonal changes that match with time to move up the mountains to work in the farm and to gather food and time to move down the village for shelter in times of bad weather.

The occasional stay of the Agta in their houses in the village prepared by the local

government for their alternative home has allowed them exposure to other life ways of villagers. A meal on canned sardines for instance has turned as a special treat for them. This indicates that their indigenous knowledge system is open to certain changes (Painemilla *et al.* eds., 2010; and CBD, 2014).

## CONCLUSION

Indigenous environmental management for sustainability is about the particularity of place, cultural, and spiritual values woven through knowledge of wildlife, forest trees, water, and land. Indigenous values associated with natural resources utilization and conservation might defy some scientific standards, as they emphasize symbolic values to indigenous identity, customary law, and environmental philosophy.

Indigenous knowledge is very specific to people and place. It is innovative and adaptive, it involves intellectual property issues that need to be well recognized and understood by all parties. Symbolic values strengthen belief to indigenous knowledge, which are priceless and are handed down from one generation to the next through apprenticeship or direct participation. Beliefs and knowledge systems require an indigenous perspective to be relevant for use, so databases from every indigenous peoples group need to be appropriately designed for specific users.

It can be deduced that the Agta of Lupigue, Ilagan City, Isabela have invaluable knowledge system for the sustainable management of available resources in their ancestral domain; thus, still cling to some of their usual traditional ways of resource utilization and conservation practices.

Different indigenous people have knowledge system to conserve their practices and maximize utilization of their resources unique to their own tribe. The Agta of Lupigue, Ilagan, Isabela have their own knowledge system to sustain management of their resources, which is unique and incomparable with other indigenous people. However, this could be a viable jumpstart for agencies in the Philippines, like NCIP (National Commission of Indigenous People), LGU (Local Government Unit), Commission on

Human Rights, Department of Education, and Commission on Higher Education to evolve programs and projects which IPs (Indigenous Peoples) can utilize to protect their rights.

Government agencies may incorporate the indigenous knowledge on natural resource utilization and conservation to contemporary wildlife management regimes through active participation of IPs. Their knowledge system on sustainability based on continuity of resources will make them effective in conservation and in protecting and managing natural resources.

The transmission of indigenous knowledge through apprenticeship may be adapted in the formulation of IPs education curriculum in general, and on the conduct of training programs with responsible personnel of government agencies for environmental sustainability in particular. It is only through knowledge application through direct immersion to life experiences that indigenous knowledge will retain its relevance and be perpetuated by future generations.<sup>1</sup>

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<sup>1</sup>**Statement:** Herewith, we have declared that this paper is our original work; so, it is not product of plagiarism and not yet reviewed as well as published by other scholarly journals.

- Interview with Respondent B, an Agta Tribe, in Ilagan City, Isabela, Philippines, on 20 January 2015.
- Interview with Respondent C, an Agta Tribe, in Ilagan City, Isabela, Philippines, on 25 January 2015.
- Interview with Respondent D, an Agta Tribe, in Ilagan City, Isabela, Philippines, on 30 January 2015.
- Interview with Respondent E, an Agta Tribe, in Ilagan City, Isabela, Philippines, on 5 February 2015.
- Interview with Respondent F, an Agta Tribe, in Ilagan City, Isabela, Philippines, on 10 February 2015.
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