

The Use of Traditional Climate Knowledge by the Iraya Mangyans of Paluan, Mindoro, Philippines

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Abstract. This ethnographic research investigated the use of Traditional Climate Knowledge (TCK) of the *Iraya Mangyans* of *Sitio Hinugasan, Brgy. Harrison, Paluan, Occidental Mindoro*. Data were collected from in-depth interviews among elders and validated by the tourism officer and minority school teacher. The inventory showed that the *Iraya Mangyans* have rich TCK which is derived from their observations of nature and some based on their rituals. The TCK has been found relevant to the community and has kept them safe from natural disasters over the years, ensured food security for their families and most importantly, made them resilient to the local impacts of climate change. Although the indigenous community of *Sitio Hinugasan* is unaware of climate change and its local impacts, some coping strategies to overcome such phenomenon are evident and have become part of their daily lives.

Keywords: Traditional Climate Knowledge, *Iraya Mangyans*, *Sitio Hinugasan*, Climate Change

Introduction

The impacts of climate change are now felt in the Philippines (PAGASA, 2011) and are expected to have great effect on human socio-ecological systems (Turner, *et al* 2003) and increasingly affect the poor (Tol, *et al* 2004). Poorer countries rely more on natural resources than developed economies and have lower adaptive capacities (Tol, *et al* 2004). The natural resource-dependent communities such as the indigenous people especially those in the developing economies are vulnerable to the effects of climate change (Oviedo & Fincke, 2009). Indigenous peoples worldwide, according to the 2010 World Bank Report, continue to be the poorest of the poor.

In a study of the climate change vulnerability of two *Alangan Mangyan* communities of Oriental Mindoro, Philippines, Ancog *et al*, (2016) found that the coping strategies that the Mangyans mastered over the years enable them to surpass normal intensity and frequency of typhoons. However, when the frequency of typhoons is doubled and upon consideration of climate change, they become increasingly vulnerable. Hence, they recommended that a

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deeper analysis of the complex socio-ecological systems of the Mangyans in relation to climate change be conducted.

Mangyan is a collective term for the 8 indigenous communities of the Island of Mindoro, which have unique culture from one another (Mangyan Heritage Center). The *Iraya Mangyans*, one of the 8 communities, can be found in both Oriental and Occidental Mindoro (Mangyan Heritage Center). In the western part of the island, they can be found in the municipalities of Puerto Galera, San Teodoro and Baco. In the east, they inhabit the towns of Abra de Ilog, Paluan, Mamburao and Santa Cruz. They are said to have curly or deep wavy hair and their skin is only slightly lighter than that of the Negritos. They are skilled in handicraft-making. The Mangyans originally occupied the shores of the island but were forced to go upland to escape from various forms of conflict (Rodriguez, 2015). They practice swidden farming locally known as *kaingin* (Ancog *et al*, 2016) and they have rich traditional climate knowledge (TCK) as compiled by Postma (2005).

Raygorodetsky (2011) defined traditional climate knowledge (TCK) as indigenous peoples' collective knowledge about the sky, land and sea that are passed on throughout generations. They are valuable insights that complement scientific data in verifying climate models and evaluating climate change scenarios developed by scientists based on a much broader scale. They provide the foundation for adaptation and mitigation strategies that sustain resilience among communities through time. According to Gyampoh *et al*, (2009), local traditional knowledge could provide the basis for the development of more effective climate change coping strategies. Traditional knowledge should be further studied and integrated into research such that indigenous adaptation measures can be mainstreamed into global adaptation strategies.

The present study explored how the *Iraya Mangyans* used their traditional climate knowledge (TCK). Specifically, it identified the sources of their TCK, investigated how they used them in adapting to the local impacts of climate change, and explored the various ways of preserving them.

The findings of this research will help the government and climate agencies implement sound policies and programs which are attuned and supportive of the traditional climate knowledge of indigenous communities like the *Iraya Mangyans*. The TCK-based adaptation measures of the *Iraya Mangyans* may also serve as model of other communities having similar contexts.

Research Questions

1. What are the sources of Traditional Climate Knowledge (TCK) of the *Iraya Mangyans*?
2. How do the *Iraya Mangyans* use their TCK?
3. What are the mechanisms in preserving their TCK?

Methods

Research Design

This study utilized ethnographic research design. Ethnography is best used when describing how a cultural group works and in exploring their beliefs and issues (Creswell, 2007). In this study, ethnography provided an in-depth understanding of the TCK of the *Iraya Mangyans* particularly on how they were acquired, preserved and applied in relation to climate change adaptation.

Study Area

The study was conducted at the Iraya Mangyan Community of Sitio Hinugasan, Brgy. Harrison, Paluan, Occidental Mindoro (see Fig. 1). Sitio Hinugasan is part of Brgy. Harrison in Paluan, a third class municipality in the northwestern tip of the province of Occidental Mindoro at 13°25'N 120°28'E. The community of the Iraya Mangyan is composed of 100 households.

Participants

Five (5) informants were invited to an in-depth interview. The three most senior *Iraya Mangyans*, coded as IMI1, IMI2 and IM3 were 62, 65 and 72 years old, respectively. IMI1 is a *kaingin* (swidden farming) farmer, hunter and a “Marayaw” (herbolario). He has 9 children and 28 grandchildren. IMI2 is a father of five and a Barangay Kagawad of Harrison. Despite his responsibility to the barangay, he manages to maintain a *kaingin* and goes on occasional hunting. IMI3 is an expert hunter, *kaingin* farmer and a renowned “Marayaw” in the community. He has 2 children and 7 grandchildren. The fourth informant, coded as TI1 is a Tagalog and tourism officer of Paluan. Since his appointment in June 2016, he has been so passionate about salvaging the diminishing culture of the *Iraya Mangyans*. He holds a collection of Iraya Mangyan artifacts which he plans to exhibit in the future. The fifth informant, coded as TI2, is a Tagalog and head of the minority school.

Data Gathering Procedure

Permission was sought from the local government of Paluan to conduct this study. Upon approval, the tourism officer then made the necessary arrangements with the *Iraya Mangyans* of Sitio Hinugasan thru the school head of Hinugasan Minority School. Consent was sought from the informants prior to the conduct of in-depth interviews. The purpose of the research, process and possible risks were discussed. The following questions were translated in Filipino and were asked during the interview: 1) In the absence of weather forecasting technologies, how did you keep track of the daily weather and expected climate? 2) Are TCK known to everyone in the community? How were they handed down from one generation to the next? 3) How do you track seasonal changes (shift from dry to wet months)? 4) How do you know the best time to plant a particular crop? 5) How do you schedule weather/climate-dependent rituals/ceremonies/celebrations? 6) What other knowledge and beliefs on weather and climate do you have? 7) Do you still find these knowledge as effective and reliable as they were in the past? 8) How did your knowledge on climate and weather help you survive in the past? 9) What changes have you observed in the environment for the last 10 years? 10) How did you respond to these changes?

The local names of plants and animals mentioned by the informants during the interview were verified using online databases. Scientific names were then given based on the descriptions provided for each species.

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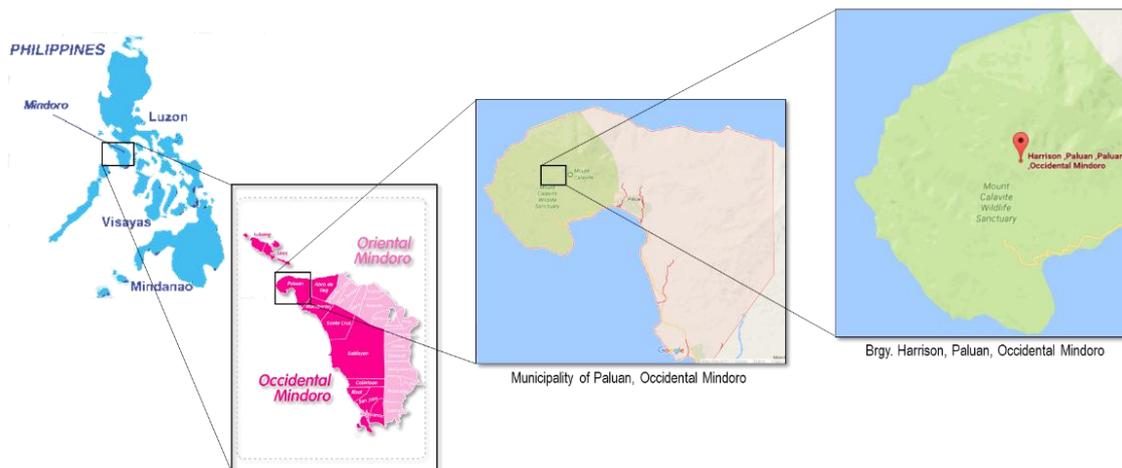


Figure 1. Study Area

Data Analysis

Interview recordings were transcribed and categories were identified based on the research questions. The categories were then grouped into unifying themes. Each theme was presented based on the research questions and discussions were anchored on the categories.

Results and Discussion

Sources of TCK

The *Iraya Mangyans* gather information on weather and climate from both animate and inanimate objects around them. Trees, animals, rock formations, rainbow and rituals are the primary sources. Weather disturbances such as tropical cyclones are forecasted by plants. Droughts are seen in the behavior of animals.

Trees know the start and end of season, time for “Kaingin” and the coming of a storm. When *Santol* tree bears fruit, the Irayas would know that rainy season is about to begin but when the *Tan-ag* tree (*Kleinhovia hospita*) bears flowers, it is the start of dry season. The flowering of *Balinawnaw* tree (*Lepisanthes fruticosa*), which they describe as a small tree that bears fruit, means that it is the best time for having *kaingin*. According to the Irayas, trees are sad when a storm is coming. It is shown by the still leaves of the trees even if they are blown by the wind. They would also know of an impending storm when on a very calm day, a big tree of any kind is uprooted.

Animal sounds mean a shift in local weather and phases of the Moon. On their accounts, the Philippine deer (*Rusa marianna*) rarely makes noise. When it bleats or wheezes at nighttime in the wild, they believe that it signals a shift in the local weather. It means that if it rains during daytime and the deer bleats in the night, the following day would be dry or sunny. The noisy deer is also a sign that Northeast monsoon or *amihan* is already in. The sound of the common house gecko (*Hemidactylus frenatus*) known in the community as “Tuko” tells them that it is New Moon even without looking at the night sky. It is a common observation that “Tuko” does not make any sound when there is no moon and is only heard on the first appearance of the crescent moon in the sky. The rare sound of the Philippine Pitta (*Erythropitta erythrogaster*), local name “Leuko”, on the other hand, signifies a downpour.

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Sound from rock formations means rainy season. Every TCK of the *Iraya Mangyans* of Sitio Hinugasan starts with the story of Magiit (see Fig. 2) and Binarera (see Fig. 3). Magiit and Binarera are sea stacks, rock features created by wave erosion. The wave-like sounds produced by Magiit and answered by Binarera mark the start of the rainy season. The Irayas claimed that those who are living in mountaintops are the only ones who can hear it. The lowlanders could hardly hear the “labu-o” or the sound. According to them, it is the Magiit which first makes the sound to which Binarera responds.

In our analysis, this by far is the most cherished TCK of the Irayas considering that it is even supported by a famous local myth. According to the myth, teenage girl Binarera and her younger brother Magiit, were asked by their mother to harvest some corn. Stuck in the heavy downpour, they decided to seek shelter inside a cave. They found a “paytusan”, a bamboo stick which the *katutubos* use to make fire. While Binarera was rubbing the “paytusan”, Magiit pressed the nipples of his sister. It was believed that “Apo Iraya” (Mother Nature) got angry and as a punishment, they were locked inside two separate caves. The two called on each other for help. At present, the Irayas believe that the siblings are still calling each other and hence the very source of the sound that they hear. Magiit is a Sitio of Brgy. Harrison while Binarera is located in Brgy. Tubili, both are part of the Municipality of Paluan, Occidental Mindoro.



Figure 2. Magiit, Brgy. Harrison, Paluan



Figure 3. Binarera, Brgy. Tubili, Paluan

The thickness of rainbow colors predicts next day weather. Irayas have observed that rainbow forms right after a rain shower or drizzle. They would know that the following day is dry and hot when the red color is thicker than the blue colour. When the blue is thicker than red, they would expect rain in the following day.

Climate of the year is read in rituals. In the afternoon of December 31st, the older Irayas would gather 8 grains of rice, 8 corn kernels, 8 vegetable seeds (commonly squash and gourd), 8 grains of salt and 8 one-peso coins. The items are arranged carefully in a large plate and placed inside a “kaban” (wooden box), preferably under the bed. In the morning of January 1st, the arrangement of the objects is compared with their original positions a night before. If the coins have moved relative to the grains, seeds and salt, it means that for that year, money is easier to find. If the rice grains and corn kernels have moved, the harvest would be plentiful for that year. If the salt is dissolved, the year would be wet.

Occurrence of drought is observed in the eating habit of chicken. Irayas are aware of the normal waking hours of their backyard-raised chicken (*Gallus gallus domesticus*). If chickens wake up earlier than usual to look for food, it is a sign that a drought is coming.

Preservation of Traditional Climate Knowledge

In the absence of formal schooling, the Irayas failed to maintain written records of their traditional climate knowledge. Like the other indigenous communities, these knowledge are passed on from one generation to another thru cultural transmission. This set of knowledge is learned through socialization and engagement with the people in the community.

Role of the Elders

Like other indigenous communities, Iraya elders are tasked to teach the younger people their traditions. However, illiteracy resulted to powerlessness and it has marginalized many of the elders. As a result, the ability to pass on their cherished beliefs diminishes. In Australia, the traditional indigenous culture of the Aboriginal communities was teared down by Western decision-making and values (McIntyre, 2001). Schools have taught the young to devalue their traditional ways. The Iraya elders themselves admitted that the young generations no longer have a good grasp of their culture. They attributed this devaluing of their culture among the younger generations to the so-called “civilizers” which include religious groups and NGOs who introduced to them new doctrines and worldviews. In essence, the Iraya Mangyan elders need to be empowered such that they can effectively perform their task of transmitting their traditions to the younger generation.

Role of the Governmen

Section 29 of RA 8371 or The Indigenous Peoples Rights Act of 1997 states that, “*The State shall respect, recognize and protect the right of ICCs/IPs to preserve and protect their culture, traditions and institutions*”. In compliance with this provision, the government thru the Department of Education and the Local Government Unit of Paluan established minority schools. One of these schools is at Sitio Hinugasan, just within the area of study. Hinugasan Minority School was built in 2007 to purposely educate the Iraya children. As of March 2017, it has a total of 102 learners in a multi-grade setting. Other than teaching what is specified in the K to 12 Curriculum, the school head admits that it is the school’s mandate as well to help preserve the culture of the *Iraya Mangyans*. Unfortunately, the teachers are all *Tagalog* and they find it hard to contextualize the lessons and the primary medium of instruction is also Filipino. The rich Traditional Climate Knowledge of the *Iraya Mangyans* as a context of instruction could have helped make science lessons more meaningful.

Meanwhile, the Municipality of Paluan have realized that preserving their indigenous communities and culture is an important step in community development. As original settlers of Paluan, the *Iraya Mangyans* hold a rich collection of folktales, songs, dances and rituals. Embedded in the folktales and rituals are functional TCK which the lowlanders might also adopt. Through its Tourism Office, the local government is collecting artifacts and beginning March 2017, the Irayas will be given a chance to promote their dances, songs and rituals.

Application and Use of Traditional Climate Knowledge

For the Irayas of Sitio Hinugasan, traditional climate knowledge played an important role in their survival. They claimed to have occupied the area since 1970 and the same TCK have helped them forecast local weather and climate, storms, and droughts in the past. Their TCK have helped them ensure enough yield from their *kaingin*. It helped them adapt to the effects of climate change.

TCK helped them survive natural disasters such as typhoons. Local knowledge and practices have long been found important in environmental hazards and disasters (Mercer, J. *et al*, 2009). It can be recalled that the

indigenous communities of Tikopia Island in the Solomon Islands which was hit by Cyclone Zoe in December 2002 survived using age-old indigenous practices of traditional housing. In the case of the *Iraya Mangyans*, their traditional climate knowledge has kept them safe from natural disasters such as tropical cyclones. This confirms the result of Ancog *et al.*, (2016) that when normal intensity and frequency of typhoons are considered, Mangyan communities are less vulnerable due to the climate coping strategies that they have mastered over the years. By simply looking at the leaves of the trees, they would know that a storm is coming in the next 2 to 3 days. They would immediately tie their houses (see Figure 4) to big trees for anchorage especially that the houses are made of very light materials. Their choice of permanent settlement is also a proof of their wise use of TCK. At present, they live in an area surrounded by mountains, shielding them from strong winds.

TCK helped enhance food security. From traditional rituals, *Iraya Mangyans* are able to predict whether yield of corn and rice from *kaingin* is good enough for the year. Also, their TCK pertaining to shift in local weather (rainy or sunny day) and on seasonal winds have influenced their decision on their *kaingin*. The flowering pattern of *Balinawnaw* tree serves more than a calendar and a clock combined, as it tells them the best time for *kaingin*. By observing the behavior of animals such as chicken, they would know that a drought is coming.



Figure 4. Typical Iraya Mangyan house

TCK offsets the impacts of climate change. The effects of climate change are already felt in the Philippines (PAGASA, 2011), yet the *Iraya Mangyans* claim that they have not observed significant changes in their environment and the climate in general. For them, hotness of dry months and wetness of rainy months have not changed. Also, they claim that the time for *kaingin* remains the same. Dry season or *tag-init* and rainy season or *tag-ulan* remain the same. So long as they have accurately and religiously performed their rituals for *kaingin*, they believe that it would give a good yield. They believe that their rituals and TCK still give them accurate forecast of the local weather and climate. The traditional climate knowledge of the *Iraya Mangyans* must be very functional and they have relied so much on them. Their TCK offsets the impacts of climate change. Their TCK helps them adapt to the impacts of climate change and makes them less vulnerable to climate change at least for now.

Conclusion and Recommendations

Based on the findings of this study, it is empirical to argue that the Iraya community of Sitio Hinugasan has a rich collection of traditional climate knowledge which they have successfully applied in making climate-related

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decisions. Using the same TCK, they are able to adapt to the local impacts of climate change even if they remain unaware of it as an environmental issue.

Considering the limited data gathered for this study, it is recommended that further research will be conducted to include more informants from other communities to assess whether these TCK are still practiced by *Iraya Mangyans*, in general. Another research may be conducted to verify whether the said TCK still give them accurate forecasts. A quantitative assessment of climate change vulnerability of this community is needed. It is also recommended that these TCK and other belief systems may be written and compiled to preserve them. Activities where the young generations are taught about their culture may be organized by either the minority school or the local government in cooperation with community leaders.

It is further recommended that concerned government agencies and institutions will develop climate coping strategies specific for the Iraya Mangyan community of Sitio Hinugasan to further lessen their vulnerability to the local impacts of climate change. These strategies may be formed from the integration of scientific seasonal predictions, climate change adaptation and mitigation ideas and traditional climate knowledge. This is to help indigenous communities like the *Iraya Mangyans* improve their weather and climate-related decisions.

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