

Indigenous Knowledge Systems and Practices (IKSP) in Disaster Risk Reduction and Management of Secondary Schools in Indigenous Cultural Communities in Abra, Philippines

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Abstract

Indigenous knowledge systems and practices (IKSP) are utilized by the Indigenous Cultural Communities (ICC) to mitigate the impact of disasters. This study determined the IKSPs in disaster risk reduction and management (DRRM) of the secondary schools in the selected indigenous communities in Abra, Philippines. It employed a mixed-method explanatory sequential research design. Data were gathered using surveys and interviews. Findings showed that the schools in the ICCs utilized their IKSPs to manage disasters along the four thematic areas of DRRM: prevention and mitigation, preparedness, response, recovery, and rehabilitation. IKSPs, as part of disaster management, include utilizing local plants, observing the behaviors of some animals and insects, observing the colors of the clouds, and performing rituals by the elders in the community. Furthermore, the result of the study revealed these IKSPs emerged to be essential in the prevention and mitigation, preparedness, response, recovery, and rehabilitation during disasters such as; "Alluyon," "Ganap," "Komon," "Sagubay," "Ubaya," "Senga," "Lapat System," "Agamang," "Bodong" and "Dap- Ay."

Keywords: *Indigenous Knowledge, Maeng, Lapat, Explanatory design, Abra.*

1. Introduction

Indigenous people have learned to mitigate the impact of disasters by utilizing their traditional and indigenous knowledge. This knowledge encompasses the Indigenous Knowledge Systems and Practices (IKSP) of the local communities, which have been passed down orally from generation to generation over centuries of experimentation (Kinomis, 2016).

The Sustainable Development Goals of 2030 recognize the worth of the Indigenous people's way of life, including their vulnerability and resiliency. Due to the high risk environments and erratic and variable weather conditions in their area, over 350 million indigenous people globally rely on the environment for their survival and are severely impacted by climate change. Identifying and recognizing indigenous knowledge's uniqueness and potential is essential to enrich the understanding of the environment and disaster management (UNESCO, 2021).

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Since ancient times, indigenous knowledge systems have been a part of human existence. This practice is crucial because it has influenced how people interact with their surroundings (Dube, 2018). Since the 1970s, there has been an increase in local knowledge and practices to improve disaster risk reduction (Dekens, 2007). In the 1990s, this knowledge became well-known and acknowledged for its contributions to climate change mitigation and disaster risk reduction (Hiwasaki et al., 2014). Furthermore, the indigenous knowledge of the local communities has been utilized to lessen the effects of natural disasters (Meyers & Watson, 2008 as cited by UNESCO, 2014). Moreover, indigenous knowledge has helped communities survive a variety of natural disasters, saving lives and property. For instance, following the 2004 Indian Ocean earthquake and tsunami, indigenous knowledge played a crucial role in helping communities survive the catastrophe. (Meyers & Watson, 2008; Tungmanee & Cruz, 2005). In some situations, local communities supplement and advance scientific knowledge with local knowledge. (Makhanu et al., 2007).

Further, using local customs to lessen the impact of disasters is exemplified by the enormous effect that the March 28, 2005, earthquake had on the people and infrastructure of Nias Island. Following the earthquake, the majority of the few traditional wood houses that remained withstood the seismic activity (Meyers & Watson, 2008).

Indigenous knowledge is invaluable in ensuring the sustainability of natural resources through conservation (Eyong, 2007). Additionally, traditional forest management practices from West Africa aid in the preservation of forests. Furthermore, the preservation of native animal species is crucial for all communities. Meanwhile, local hunters in Africa use traditional knowledge to protect native species by avoiding pregnant and young animals when hunting for animals considered as delicacies. Furthermore, it guarantees the survival of these species (Eyong, 2007).

In spite of this, indigenous knowledge has not received much attention in disaster policy or science, despite the fact that it is crucial for lowering the risk of disasters and preparing for climate change (Adger et al., 2011). Certain disaster risk reduction practitioners continue to question the applicability and efficacy of indigenous knowledge, viewing it as closed, parochial, unintellectual, primitive, and emotional (Herbert, 2000; Mitchel, 1995).

In the Philippines, One Hundred Ten (110) major Indigenous groups depend on traditional swidden agriculture utilizing available upland areas. Climate-related hazards aggravate their neglected and marginalized condition (De Vera, 2007 as cited by Hirai, 2015). However, indigenous people have generally shown themselves to be resilient despite disasters and adversities because of their local survival strategies. Indigenous communities that have experienced disasters are more resilient to the risks and disasters associated with climate change because they have ingrained knowledge and coping mechanisms that have been developed via close relationships with their natural environments (Cuaton & Su, 2020). The understanding that this knowledge is a living practice that can adjust to changing circumstances and minimize risks is acknowledged by intergovernmental organizations (UNHCR).

The Province of Abra has eleven (11) Indigenous Cultural Communities (ICC) collectively called Tinguian. The words Tinguian, or "Tinggian," "Tinggianes," or "Tingues," and "Tingians" all mean "Mountain Dwellers" and those who tried to avoid the advancing Christian Ilocano went to the uplands. "Tinguian" is used synonymously with the word "itneg," derived from "uneg," which means "the interior," from the combination of the prefix i-, indicating a place of origin, and Tineg, the name of a significant river and geographical area (Schmitz, 1971). Tinguian or "itneg" also refers to the language spoken within the province of Abra (Begnalen, 2009). Eleven ICCs encompass Abra: Adasen, Belwang, Binongan, Faratok, Gubang, Inlaud, Mabaka, Maeng, Masadiit, Muyadan, and

Vanaw. The Indigenous Cultural Communities have their corresponding settlements in the 27 municipalities in the province (Llaneza, 2016).

The worth of this indigenous knowledge in mitigating the advent of disasters has not been well documented. Some IKSPs have been transmitted orally, and some are documented by organizations sporadically. With the introduction of scientifically based Disaster Risk Reduction policies and frameworks, these IKSPs are ignored as they are deemed less significant than scientific understanding (Mercer et al., 2010). With the advent of the arrival of colonizers, assimilations. While the Philippine Disaster Risk Reduction Management (DRRM) Act of 2010 changed the nation's response to disaster risks from a historically reactive to a more proactive one, (Fernandez et al., 2012), many local government organizations continue to operate under a top-down paradigm that ignores indigenous knowledge, putting IP and other vulnerable groups in danger because they are not included in the process of developing both their resilience roadmap and their larger development agenda. Furthermore, there are still few studies on the integration of indigenous knowledge systems and practices in school settings for disaster risk reduction and management.

This study used the 4r Theory of Disaster Management described by the four areas of activity; Reduction, readiness, response, and recovery by the New Zealand integrated civil defense emergency management approach. And the Comprehensive DRRM in Basic Education Framework through DepEd Order 37, s. 2015. The framework serves as a basis for all DRRM efforts in primary education towards attaining DepEd's three significant outcomes: Access, Quality, and Governance. It was the anchor of this study because its objective is towards DRRM implementation in the education context under the four thematic areas stipulated under RA 10121, namely: (1) Prevention and Mitigation, (2) Preparedness, (3) Response, and (4) Recovery and Rehabilitation.

Since there is a shortage of studies conducted on IKSP in DRRM in indigenous communities in the Province of Abra, this study is conducted to surface the indigenous knowledge systems and practices in DRRM of the secondary schools in the indigenous cultural communities in Abra. The study results would benefit the schools as it will establish baseline data for a revised DRRM program and policy recommendation to include indigenous knowledge in DRRM to support the Comprehensive Disaster Risk Reduction and Management in Basic Education Framework. Additionally, this study will benefit the male and female school personnel in implementing IKSP in DRRM within the following thematic areas: Prevention and Mitigation, Preparedness, Response, Recovery, and Rehabilitation for a safer and more resilient environment.

2. Objectives

This study aimed to surface the indigenous knowledge systems and practices (IKSP) in DRRM of the secondary schools in the indigenous cultural communities in the Province of Abra, Philippines. More specifically, it determined the support of stakeholders in making the school buildings resilient, the adequacy of resources used in implementing DRRM, and the indigenous knowledge systems and practices (IKSP) in DRRM, along with mitigation, preparedness, response, and rehabilitation. The study also investigated the problems encountered in implementing IKSP in DRRM in the school.

3. Methodology

The study utilized the mixed method explanatory sequential research design. The qualitative approach was utilized to provide a more thorough explanation of the preliminary quantitative results, thus, it is crucial to link the quantitative results to the qualitative data collection (Creswell & Creswell, 2018).

Purposive sampling was applied, which entails locating and choosing cases with a lot of information in order to make the best use of the limited resources available (Patton, 2002). The sample of participants includes the secondary school heads, teachers, and external partners from the eighteen (18) schools located in the eleven (11) Indigenous Cultural Communities (ICC) in the Province of Abra, Philippines. The 11 ICCs include Adasen, Binongan, Faratok, Ferwang, Gubang, Illaud, Mabaka, Maeng, Masadiit, Muyadan, and Vanaw. School heads, teachers, and external partners of the 18 secondary schools in these ICCs were included as respondents in the study.

The indigenous knowledge systems and practices in disaster risk reduction and management along the four thematic areas of DRRM in the secondary schools were administered using a survey questionnaire. This method was followed by a semi-structured interview, which involved audio recording technology to capture the interviews, which were transcribed verbatim to facilitate analysis.

The instrument was crafted by the researchers and was subjected to validation by five (5) experts in the field of IKSP and DRRM, such as the Provincial DRRM Officer, Schools Division DRRM focal, Indigenous Peoples (IPEd) Supervisor, School Head from the ICCs, and the Indigenous Peoples Mandatory Representative (IPMR). According to Domènech, et. al. (2019), questionnaires should be validated in order to assess the internal consistency and content validity of an instrument designed to assess the perceived impacts of a wide range of research projects. The instrument has a 98.9 percent reliability using the Cronbach Alpha Reliability Test.

The analysis of quantitative data collected from surveys involved the utilization of both inferential and descriptive statistics. Thematic analysis was used to analyze the qualitative data, which included the following steps: (1) transcribe data from digital recorders and field notes; (2) make meaning-based translations from vernacular to English; (3) identify significant statements in the interview transcript; (4) generate codes; (5) highlight key phrases; and (6) define and name themes to cohere around a central idea.

4. Results and Discussions

4.1 Support of stakeholders in making school buildings resilient

The schools in the selected indigenous cultural communities in Abra have strong support from external partners in making their buildings resilient. They received extensive support in the conduct of "ganap," an indigenous way of community service working together in the clean-up drive of the school for free, in putting up an Indigenous Peoples (IPEd) Center in the school where learners learn local ways of survival and self-protection. Based on an interview with some stakeholders, one claimed, "if there are work to be done in school, especially on the construction or repairs of classrooms, all parents will lend a hand without any remuneration. This is one way of showing our care and love to the school and our children." One school head added, "Whenever there are projects to be done in school, the community stakeholders do not hesitate to offer help by bringing their materials and even food." Another teacher added, "During Brigada Eskwela, "Ganap" is very evident." This approach is similar to Brigada Eskwela, or School Brigade, which is also referred to as National Schools Maintenance Week. It is a nationwide volunteer initiative that was started in 2003 by Republic Act 8525 with the goal of fostering stronger relationships with the surrounding communities. The concerted solidarity of the local community and the school in helping one another achieve a particular task without anticipating or requesting anything in return.

The schools, likewise, received extensive support in fencing the school premises, putting up gardens for herbal plants and vegetables; conducting symposiums on climate change, disaster risk reduction, and environmental protection. Along with the spiritual aspect, the external stakeholders also spearhead prayer worship, integrating the enculturation of

Tingguian culture, performing rituals in the construction of school buildings and during school activities of "Kabunian." As an effect of this support, the school became safe, and the teachers felt secure, as some revealed, " We now have peace of mind that stray animals no longer invade our school. We thank the BLGU, LU, and other private partners for keeping our school safer." This is congruent with the provision of RA 8525, otherwise known as Adopt-a-School. The teachers also appreciated the stakeholders' help in their gardening activities because their harvest augmented the school feeding program.

4.2 Availability of resources in implementing DRRM

The schools do not have many resources needed to implement disaster risk reduction management like IEC materials and DRRM materials. The materials exist but are not adequate. The schools do not have adequate IEC materials posters for color-coded rainfall advisories, thunderstorm levels, or "to do list" before, during, and after a tropical cyclone or flood. They also don't have adequate DRRM school handbooks, cell phones, or two-way radio for each learner, DRRM video recordings, digital files, and documentaries that are electronically accessible. However, the schools have tropical cyclone wind signal posters, emergency hotlines, and emergency social media account advisories available.

DepEd Order NO. 21, s. 2015 mandates schools to keep, distribute, and post relevant and up-to-date emergency hotlines in strategic locations throughout the school. The DepEd Order also requires schools to establish early warning systems, such as bulletin boards with bells and sirens for weather advisories, evacuation plans, and other information; they also have to post safety precautions and plans online; and they have to conduct disaster preparation exercises, such as quarterly multi-hazard drills that are relevant to the school's identified hazards, such as fire, flood, and earthquake.

Table 1: Availability of Information, Education and Communication Materials and Disaster Risk Reduction and Management Materials

Indicators	Mean	Overall DR
Information, Education, and Communication Materials	3.12	Moderately Available
DRMM Materials	3.22	Moderately Available
Overall	3.17	Moderately Available

DRRM materials in school are also moderately available. The schools have available but not adequate first aid kits, early warning devices, evacuation plans mounted in all classrooms and school buildings, DRRM bulletin board, and a school DRRM team. They also have available hard hats or improvised headgear but not for all learners, and fire exits but not for all buildings. However, emergency kits are available for every learner, triangle area at the entrance of the school, and school improvement plan that integrates DRRM-related activities.

4.3. Indigenous knowledge systems and practices (IKSP) in DRRM

The school's indigenous knowledge systems and practices in disaster risk reduction management was determined along with prevention and mitigation, preparedness, response, and recovery and rehabilitation. The schools have a high level of IKSP. This result demonstrates their commitment to implement disaster risk reduction management on a continuous basis to ensure that the schools are ready to conduct effective disaster responses while reducing risks that disasters will occur.

Table 2: Summary of the Indigenous Knowledge Systems and Practices in Disaster Risk Reduction and Management

Indicators	Mean	Overall DR
A. Prevention and Mitigation	3.63	High

B. Preparedness	3.58	High
C. Response	3.59	High
D. Recovery and Rehabilitation	3.72	High
Overall	3.63	High

Prevention and mitigation aims to limit or lessen the harmful effects of hazards and related disasters. Mitigation measures include engineering techniques, hazard-resistant construction, improved environmental policies, and increased public awareness. The schools highly support indigenous knowledge systems and practices for managing and reducing the risk of typhoons, earthquakes, and disease outbreaks. The schools introduce the importance of Tuping or riprapping to protect the school from erosion, integrate the preservation of natural resources, known as the Lapat System, in the lessons, and incorporate the method of mixed cropping in the curriculum to preserve the soil fertility. Moreover, the schools have a high level of IKSP in mitigating earthquakes. They advocate the indigenous ways and materials for constructing earthquake-resilient school buildings. The schools also highly encourage using indigenous practices to mitigate diseases. They integrate into the lessons the practice of Tanggad (refraining from foods prohibited to a particular sickness), using bonnets, socks, and sweaters, and drinking lukewarm water after giving birth for at least three months. Consuming warm water after birth can help reduce excess stomach fat and help lose weight (Das, 2018).

The Maeng Tribe of Tubo's native resource management system, known as the Lapat System, is used to oversee the natural resources inside their ancestral domain (Nuval, 2013). In addition, the practice aims to control, safeguard, and preserve resource usage as well as biodiversity. Three steps are involved in putting the Lapat into practice: sharing information, carrying out the Bagawas ritual, and keeping the Lapat. Every member of the community serves as a forest guard; when infractions occur, the barangay council and "Dap- ay" are notified.

Along with the preparedness aspect of IKSP, the schools are making efforts to explain, introduce, demonstrate, and integrate indigenous practices in preparing for typhoons, earthquakes, and disease outbreaks. The schools provide their stakeholders adequate knowledge about the function of agamang, food pantry, or storage that will last for long rainy days. They, likewise, demonstrate food preservation using bamboo, bakubak (dried big patola), and sacks placed near the fireplace to be constantly smoked or on doorsteps to be stepped upon. Meanwhile, the schools illustrate the indigenous ways of preparing for earthquakes. Cuaton and Su (2020) shared in their study that an informant quipped the night before, and earthquake happened; there was an unusual silence among the crickets. That sign made the informant suspicious of an impending earthquake, and sure enough, one occurred the next day. On the contrary, Gerstenberger (2023) claimed that neither the USGC nor any other scientists have ever predicted a major earthquake. Earthquakes cannot be predicted, and scientists can only calculate the probability of a significant earthquake. Along with preparation for disease outbreaks, the schools introduce the plants used to treat diseases. The schools used the results of Cordero's (2020) study on medicinal plants where balsamifera and vulgaris can be used to treat many ailments.

Regarding response as another component of IKSP in DRRM considered in the study, the schools offer public assistance and emergency services during or right after a disaster through the use of indigenous practices. They use indigenous medicinal plants to cure illnesses affected by calamities. They help transport patients affected by disasters using blankets/indayon as carriages. On the other hand, the schools use rafts or racket as transportation. Some indigenous cultural communities where the schools belong use bamboo rafts for transport. As a response to an earthquake, the stakeholders are encouraged to do Perform the Drop, Cover, and Hold-on. They encourage people to run to a safe place and beg for the help of Kabunian, the indigenous name of God, for help.

Kabunian is revered by the Tinguinans as their creator, friend, and provider for those in need.

On the other hand, the schools encourage using indigenous headgear like the coconut husk to protect the head from falling debris. For IKSP for disease outbreaks, the schools participate in community practices like that of Sagubay. According to the elders, Sagubay is applied to widespread sickness or epidemics where the affected community is quarantined. A ritual, solemn ceremony, is performed inside the community to drive away sickness, and there are attached prohibitions or ngilin to it. For the Faratok, Sagubay is performed at night. Starting from the boundary in the west to the east, they create sounds by shouting with instruments to drive evil spirits.

Moreover, Ubaya is also practiced by the Muyadan, which is headed by a Pangat (ritual leader). The practice is to request Kabunian for sickness protection or an abundance of harvest. The ritual is performed with a didiyam (prayer that can be sung or spoken verbally) by butchering a native black pig. The liver and apdo (bile) of the pig is read by the Pangat. If the liver and the bile are thick and in good shape, there is a tendency for the sickness to be gone soon, whereas if it is thin, they will butcher another native black pig. During the Ubaya, nobody can go out and enter the community. Anyone who violates will be fined as set by the Pangat. These indigenous practices came out as a result of an interview with elderlies in the community.

Recovery and Rehabilitation. The schools participate extensively in recovering and rehabilitating typhoons, earthquakes, and disease outbreaks. They have high participation in the recovery and restoration after a disaster through indigenous practices, namely, the Alluyon or Tagnawa, Innamuyo, Ganap, or Padigo systems. These are the indigenous terms for Bayanihan. It is a usual practice for the local community to help in times of disaster.

Tagnawa is usually practiced during the restoration or putting up of a structure or a house damaged by a disaster like a typhoon. Ritual is also part of the Tagnawa, where a native black pig is butchered, and the Pangat (elderly leader) will make a didiyam (prayer) as he sprinkles the blood on the ground where the structure is to be built. Esguerra (2019) pointed out that Tagnawa is banding together with men and women from the neighborhood to assist one another during hard times, without regard for monetary compensation. Such an act would lessen the burden on the affected family, school, or community with financial matters and other resources.

The schools also adopted Innamoyo as one of its partnership programs with the same goal of helping the education sector as stipulated in DM No. 224, s. 2021. This aims to strengthen engagement in the education of the goals of the Whole Nation Approach and provide opportunities for learners to improve their participation in the school or community.

Padigo does not only mean sharing viand with neighbors, but it also means sharing resources. This value should be inculcated into learners' minds that sharing is a participation in the community practice of the Ganap, an indication of their high involvement in community restoration. An interview with the school heads reveals that for those from Maeng ICC, when somebody dies in the community, each household, which includes the families of teachers, gives one salop (ganta=3.5 kilos) of rice plus 20 pesos to the bereaved family. A collector is assigned per barrio and then submits the rice and money to the bereaved family. Besides, the elders perform rituals during and after the wake. Moreover, the community collectively prepares patupat (rice cake). In the aftermath of a disaster, the schools join in cleaning the community, and families cook food and share it with those doing the Ganap or Innamuyo. For indigenous knowledge and practices during disease outbreaks, the schools explain and take part in the Sagubay, Ubaya, and Alluyon.

4.4 Problems Encountered in Using IKSP in DRRM

Some problems were encountered by the schools while using indigenous knowledge systems and practices in their disaster risk reduction management. The problems gathered emerged in two themes: attitude towards IKSP in DRR, and limited sources of IKSP in DRRM. Attitude towards IKSP and lack of scientific validation are the two sub-themes under attitudes, while limited resources and limited knowledge for limited sources of IKSP.

Attitude towards IKSP. The respondents have doubts about knowledge claims outlined in various areas. Some teachers have difficulty convincing their co-teachers to at least believe in the IKSP that is being practiced in the community. On the other hand, younger generations tend not to believe in indigenous knowledge because they are more engrossed with what they see on the social media. Some indigenous practices are now being replaced by modern mentality. These problems support the findings of Banes and Dela Cruz (2021) that different religious beliefs and ideologies influence the Ips' changing perspectives on their cultural practices. Because of their religious beliefs, they are unable to carry out their cultural traditions. Due to the lack of scientific validation, some respondents believe that if it is not documented, it will be forgotten. Some traditions could have faded away and stopped being practiced. The elders of the pilot IP communities expressed dissatisfaction over the younger generations' apparent preference for modern communication over hearing the tales of their ancestors. According to Mercer et al. (2010), there is a lack of adequate documentation regarding the value of indigenous knowledge in averting the onset of disasters; some IKSPs are ignored as they are viewed as inferior to scientific knowledge. Teachers' and school administrators' perspectives on IKSPs are also altered by modernity. The current generation saw indigenous cultures as outdated due to Western education and technological advancements (Banes & Dela Cruz, 2021)

Limited sources of IKSP. One of the problems in implementing IKSP in DRRM by the schools heads and teachers is the lack of resources. Limited IKS reference materials, such as books, research on culture, documentary videos, materials on culture, and other related instructional materials, are readily available in the library. In addition, some administrators and teachers lack proper training and orientation about IKSP. IKSP are situated within a framework of social norms, ethical standards, religious convictions, taboos, rituals, innovations, and other cultural practices.

5. Conclusions

The schools have available information, education, and communication materials to implement disaster risk reduction and management. They receive tremendous support from their external partners, making the schools' successful implementation of their programs, projects, and activities possible. The schools use indigenous knowledge and practices in managing disaster risk reduction, particularly in prevention and mitigation, preparedness, response, recovery, and rehabilitation for typhoons, earthquakes, and disease outbreaks. In using indigenous knowledge and practices in managing disaster risk reduction, the schools encountered problems like the attitude of the community towards IKSP, specifically skepticism and lack of scientific validation, and limited sources of IKSP since these are frequently passed down through songs, stories, and other cultural customs. Hence, the need for the schools to enhance their contingency planning to include IKSPs in DRRM such as "Lapat System," "Alluyon," "Innammuyo," "Ganap," "Sagubay," "Ubaya," "Agamang," "Dap- ay," "Bodong" indigenous food preservations, indigenous medicinal plants propagation, adoption of the coconut as headgear, through conduct of research, training and symposiums.

Ethical Statement

The study has been approved by the University of Northern Philippines Ethics Review Committee. The researchers sought permission and approval to conduct the research in the secondary schools that are part of the ICCs from the Schools Division Office of Abra via the Schools Division Superintendent. Likewise, the researchers requested Free Prior Informed Consent (FPIC) from the National Commission of Indigenous Peoples (NCIP). Consent-seeking shall follow the community's customary governance processes (DO # 16, s. 2017).

Meanwhile, the respondents were given consent forms prior to the study. They have a choice to decline to answer or to be interviewed. In gathering data, the dignity, rights, safety, and well-being of the respondents were given primary consideration. The protection of the participants' privacy and the confidentiality of the research data was ensured. Respect for cultural practices was ensured. Anonymity of individuals was maintained, and any communication about the research was done with honesty and transparency.

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