

# The Practicality and Applicability of Using Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation in Four Municipalities in the Province of Sorsogon, Philippines

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## Abstract

Through a phenomenological approach, this study puts into writing traditional knowledge and practices related to disaster risk reduction and adaptation to climate change in Sorsogon province. Elderly participants from the municipalities of Prieto Diaz, Casiguran, Irosin, and Sta. Magdalena were engaged in a series of focus group discussions (FGD) between February and June 2014. The indigenous technologies collected reflected Deken's four pillars of local knowledge in disaster preparedness where observations were used to anticipate disasters: signs from animals (e.g. duck behavior before a typhoon), signs from the environment (e.g. sound of the rising of the river), unique signals for certain disasters (e.g. wild animals coming down the mountain slopes in an impending volcanic eruption), and weather superstitions (e.g. red skies associated with inclement weather). As a community, adaptation strategies (e.g. continuous ringing of bells) were verbally passed on to younger members to ensure survival of succeeding generations. Some signals were similar in other countries (e.g. a coiled snake floating in the ocean warns local residents of a storm; Nepalese, of flood) and some have scientific bases (e.g. bird migration when winds shift directions) but culture was vital in their integration to community practice. Indigenous knowledge, such as this inventory, is significant in contemporary times to further disseminate people's patterns of livelihood and manifestations of resilience. As a baseline, it could enhance provincial-wide mitigation strategies as mandated by the Philippine DRRM Act of 2010 with high considerations for culturally-appropriate policies that acknowledge people's ability to transfer knowledge within and between generations.

**Keywords:** *disaster preparedness, indigenous knowledge, resilience, weather superstitions, traditional practices*

## Introduction

The combination of natural hazards such as typhoons, earthquakes, and volcanic eruptions makes the Philippines the third most disaster prone country in the world based on the 2018 World Risk Index (Heintze *et al.*, 2018). On average, 20 typhoons affect the country yearly, of which around eight make landfall in the Bicol region (Fano *et al.*, 2007). This is usually brought about by the tail end of the cold front, prevalent between November and January, and the intertropical convergence zone that occurs in May toward the end of October. Long disturbances in the region's climate also occur in the form of land, sea, valley, and mountain breezes. These phenomena dump large amounts of rainfall in the region (Puentebella, 1994).

Across time, Bicol communities had assembled local

strategies against the threats of natural hazards to ensure their survival. In the case of Sorsogon in the Philippines, the applicability of such local information, passed on verbally, remains confined to certain municipalities and have not been systematically collected nor refined to aid in cushioning the impact of climate change and disasters on a provincial scale. As a response, this paper puts into writing indigenous technologies related to disaster preparedness and survival of the people in four select municipalities: Prieto Diaz, Casiguran, Irosin, and Sta. Magdalena.

This study could guide policymakers in enhancing resilience of localities through establishing a culturally-appropriate disaster response as mandated by the Philippine Disaster Risk Reduction and Management Act of 2010.

## Materials and Methods

Through a phenomenological approach, clear, undistorted description of the way things appear as perceived by the participants (Smith, n.d.) were achieved in this study which utilized a series of FGDs between February and June 2014 in Prieto Diaz, Casiguran, Irosin, and Sta. Magdalena. It involved the elderly, aged at least 60 years who had the ability to remember both remote and recent past, who were selected through the assistance of the barangay chairpersons and health workers after the approval of the respective officers of the Disaster Risk Reduction and Management (DRRM) offices. Their membership to any indigenous group was not identified in this study since the long-term residency was sufficient to gather the intended information: descriptions of the typical climate in their hometowns, the various disasters experienced, and the actions that have proven effective for the survival of the communities. The variations in landforms and disaster risks in the areas formed the criteria for choosing them as shown in Table 1.

Consequently, thematic analyses of results were conducted and a validation of results through interviews with a DRRM officer and some residents were done to ensure accuracy of results.

**Table 1.** Characteristics of the selected municipalities of Sorsogon, Philippines

Municipality	Landform	Disaster risk
Prieto Diaz	Upland, coastal	Typhoon, flood, drought
Irosin	Upland, volcanic	Typhoon, flash flood, eruption
Casiguran	Coastal	Typhoon, flood, storm surge
Sta. Magdalena	Upland, coastal	Typhoon, flood, drought

## Results and Discussion

### Common signals for disasters

Signals for disasters were commonly observed in animals and the environment. Locals from Prieto Diaz and Sta. Magdalena associate duck behaviors with typhoons. These fowls soar above rooftops and fly far enough that some get lost. Conversely, when ducks fly

rather low than their usual, strong winds and rains are coming, according to Irosin residents.

Santa Magdalena villagers tell of a fallen tree that is not caused by a strong wind or any related force to warn them against typhoons. But when the same is found in Irosin, specifically in a volcano's gully, it signals a possible eruption of Mt. Bulusan. These deep canals are usually barren that the odd phenomenon is taken seriously.

Sounds from the surroundings also give out a warning. Coastal villagers of Prieto Diaz would hear a strong sound from the sea that happens with the shifting of the northeast wind and is believed to forecast a typhoon. On the other hand, the few families in Irosin who live along the riverbank rely on a certain sound that prompts them to evacuate before such a body of water eventually swells and cause flooding.

### Unique signal for each disaster

The environment offers a number of signals unique for typhoons. One is on the constant appearance of red skies along with the shifting of the northeast wind to the southwest monsoon. Those along the coasts claim to hear a strong sound coming from the sea every time the wind shifts directions. Among animals, people observe the following to deliberately enter homes: frogs, fireflies, and winged termites. The latter would swarm fluorescent bulbs and wirings. A possible storm surge is associated with a full moon that lacks luminosity, most especially when a halo surrounds it.

People usually associate the impending eruption of Mt. Bulusan with both animal behaviors and events in the environment. Wild pigs, deers, birds, and snakes would be seen coming down the slopes of the volcano along with lightning and tremors related to the volcanic activity.

There had been no recorded signals nor experiences drawn from animals or the environment pertaining to a drought warning. This may mean that signals from nature may pertain to certain types of disasters only or that the selected communities had not formed a local knowledge on a rather infrequent phenomenon.

### Similar signals observed in other countries

Irosin villagers were taught by their forefathers to be wary of a reddish sky in the late afternoon for it forecasts an upcoming storm. Similarly in Vietnam, floods are expected to occur when the color of the water or of the clouds changes (Dekens, 2007°).

Prieto Diaz residents are sensitive to the sounds from the ocean. As mentioned, they prepare for a possible typhoon whenever they hear such a sound that coincides with the shifting of the wind. In Mahottari District in Nepal, a sound of a bus traveling at high speed before a flood occurs is heard (Dekens, 2007<sup>a</sup>).

The moon has been observed by Casiguran villagers in preparation for a storm surge, an abnormal rise in sea level that occurs during tropical cyclones (DOST PAG-ASA, n.d.), which happens when a full moon is rather pale as described earlier. The Vietnamese An Hai dwellers can forecast drought and schedule the planting of crops by observing this satellite. Their proverb states, “Corona around the moon, there will be a drought year; halo around the moon, rain soon.” (Huy & Shaw, 2008).

A snake coiled on itself floating in the deep part of the ocean is considered ominous among Prieto Diaz fishermen that they immediately head back to the shores before a storm catches them. In Nepal, floating wood, snakes, and dead animals in the water are also seen before a flood happens (Dekens, 2007<sup>c</sup>).

### ***Superstitions in indigenous knowledge***

Indigenous knowledge encompasses a network of aboriginal beliefs and practices, including weather superstitions which still abound today.

A British author specified that a halo around the moon on a clear night indicates an incoming bad weather (Barns, 2019). Similarly in Casiguran, a pale full moon surrounded by a halo is considered a storm surge warning.

Fralick (2011) featured the rhyme about changes in sky colors: “Sunset red and morning gray sends the traveler on his way / Sunset gray and morning red keeps the traveler to his bed.” The red skies during Amihan season (in Prieto Diaz) or in the late afternoon (in Irosin) are important clues for people to prepare for a typhoon. Additionally, whistling at sea is considered bad luck since it will “whistle up a storm” (Thompson as cited in Barns, 2019).

A creature in weather superstitions has been told by South Africans. It is an animal found in the ocean that is thought to block the rain and cause the El Niño phenomenon (Salite, 2019).

### ***Sources and purposes of Indigenous Knowledge***

UNESCO refers to indigenous knowledge as “unique ways of knowing” integral to the cultural complexities

of a certain society (UNESCO, n.d.<sup>a</sup>). The various information in this inventory are indeed customized to the particular municipalities which form part of their oral tradition—the dynamic and highly diverse oral-aural medium for evolving, storing, and transmitting knowledge, art, and ideas (Foley, 2019).

In every generation, the knowledge from their forefathers are reinterpreted according to the challenges and opportunities of their specific times as well as the availability of new tools and skills (UNESCO, 2017). Through this, contemporary practices blend with the old that allow indigenous communities to uphold their unique lifestyles and worldviews (Baumwoll, 2008).

### ***Indigenous knowledge in DRRM***

The connection between indigenous knowledge and disaster preparedness lies in the close relationship of communities with their environment—the sea, the rain, the wind, clouds, vegetation and wildlife offered signs for people to predict hazards (Scott *et al.*, 2012). As a community, they establish a series of actions that they deem as an effective response. In the adjacent province of Albay, for instance, the rapid ringing of bells prompts residents in high-risk areas to assemble in a designated place and prepare for evacuation (Naz *et al.*, 2020). The same practice has been documented in Casiguran since the 1970s and is referred to as *bayabay*. In inclement weather, a designated person goes around the village on foot, striking a stick on an improvised tin can several times to call on residents to gather at the plaza. Consequently, the parish priest and his sacristan would ring the church bell continuously for 10 min. In recent years, the response to this disaster-related problem improved with the creation of a fixed breakwater along the shoreline, as well as mangrove forests. To enhance the process of providing warnings, volunteers of the Bantay Dagat program are tapped during *bayabay*.

Indigenous communities and their culture are inseparable from all phenomena related to their land, territories, and natural resources (Nourgam, 2019). Their local strategies were based on how much they were affected by the calamities in terms of lives lost, destruction to properties and livelihood and how often the hazards occur. For their communities to survive, it was imperative for them to transfer traditional knowledge across generations (Espinosa, 2019). Most of them had been done orally in forms of proverbs, worshipping activities and ceremonies, and rituals which become embedded in the memory of community members (Dekens, 2007<sup>c</sup>).

To achieve more effective and appropriate disaster mitigation programs, attempts to integrate traditional practices with scientific strategies had been considered. However, it should be noted that some of the beliefs may be unique to specific communities and may not hold true to others. Thus, participative assessments of both capacities and vulnerabilities must involve the local community in policymaking processes (Scott *et al.*, 2012) to come up with institutionalized integrated strategies in the context of their continued survival.

### **Signals with scientific bases**

Storms are usually associated with low-pressure systems so falling barometric pressure could be a cue that a storm is approaching (Breuner *et al.*, 2015). Birds can detect air pressure changes early enough and leave that specific location (Angier, 2012). Flocks of birds (*kanaway*) would be seen along Prieto Diaz's coast in August each year when the wind shifts from northeast to southwest. Thus, bird migration marks the beginning of the typhoon season in the province of Sorsogon.

Winged termites that come together in large groups and deliberately enter homes signify heavy rains. These termites enter through holes and openings in windows, ceilings, and floors and once inside, swarm fluorescent bulbs and wirings. Lyons (2017) stated that moths, flies, and many other flying insects are naturally attracted to light (positive phototaxis) and this intentional behavior of termites is hard not to notice.

Earthworms have also been observed in Prieto Diaz. They naturally burrow deep into the soil so that when the area is dry, they move to deeper soil layers, revert to hibernation, or else die. Apparently, prolonged exposure to temperatures 35°C or above kills the worms (Duiker & Stehouwer, n.d.). However, earthworms in this community would be seen staying around kitchen drainages for a few days while the weather is warm and humid. Afterward, inclement weather affects the place.

A four-legged early warning system in Mount Etna in Italy has been established which involved recording restless movements of goats and sheep roaming its slopes hours before an eruption (Wikelski as cited in Maier, 2011). Simultaneous movements of animals on the slopes of Mt. Bulusan has indeed guided Irosin residents to prepare for imminent danger. The animals are more keen to the thunder (*kikilat*) and tremors (*linog*) caused by the volcanic activity.

### **Indigenous knowledge in contemporary times**

Communication processes of aboriginal populations propelled the development of local capacity as people worked with their natural environment across time (Scott *et al.*, 2012). However, Espinosa (2019) warned of the risk of (indigenous) knowledge accumulated over thousands of years of permanently vanishing.

In 1992, UNESCO established the Memory of the World (MoW) Program to increase awareness and protection of the world's documentary heritage and provide for its universal and permanent accessibility. In 2015, the UNESCO General Conference required local and international scenes to create enabling environments for identifying documentary heritage, promoting its preservation and enhancing access (UNESCO, n.d.b).

The Memory of the World website acts as a repository of data which can be of use to communities that need information in coming up with unified actions toward minimizing environmental hazards. It provides an avenue for the integration of scientific strategies among local communities. In fact, certain communities can benefit from the best practices and experiences of others. While it is acknowledged that communities greatly vary in culture, political set-up, economic status, and risk for environmental hazards, disseminating the lessons learned from certain disaster risk management strategies still prove helpful.

The importance of preserving documentary heritage was further highlighted by anchoring it to the achievement of the 2030 Agenda for Sustainable Development (SDGs), particularly SDG 4 target 72—ensure inclusive and equitable quality education and promote lifelong learning opportunities for all; SDG 11 target 43—make cities and human settlements inclusive, safe, resilient, and sustainable; and SDG 16 target 104—promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build effective, accountable, and inclusive institutions at all levels (UNESCO, n.d.<sup>b</sup>). The inventory produced by this study is presented in Table 2.

**Table 2.** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Prieto Diaz	<p>Typhoons</p> <p>Happens regularly because Prieto Diaz lies along the typhoon belt</p> <p>Referred to this time of the year as “maraot na panahon” (inclement weather) or “panahon ng Habagat” (southwest monsoon season)</p> <p>Described as the occurrence of sudden onset of either heavy rains, strong winds, or both</p> <p>Typhoons would come every Friday for the whole month of November that they aptly referred to it as burubiyernes</p>	<p>Flocks of birds (<i>kanaway</i>) migrate from Samar and appear around August of each year</p> <p>Wind shifts from the cool north-east (Amihan) to Habagat</p> <p>Ducks soar above rooftops and fly far enough that some get lost</p> <p>Earthworms come up the soil in kitchen drainage of households for a few days</p> <p>Groups of winged termites (<i>dararo</i>) enter homes and swarm fluorescent bulbs and wirings</p> <p>Frogs enter houses</p> <p>A snake coiled on itself floats in the ocean</p>	<p>A very calm sea</p> <p>A strong sound from the sea that is heard when the wind shifts to Amihan</p> <p>Banana leaves remain untornd</p> <p>A young coconut leaf falls off the trunk and lands with its edge stuck on the ground in an upright position</p>	<p>Red skies during Amihan</p> <p>Constructed a sirong, a shallow basement in homes, where family members gather during a typhoon; they also bring mats to keep them dry</p> <p>Used several mats to shield from wind and rain while family members huddle underneath a wooden table</p> <p>Plates, glasses, and other kitchenware were kept in boxes and buried below their homes to prevent them from breaking</p> <p>Tanod would spread out on foot to inform every household to prepare for impending calamities; a practice called bayabay</p> <p>Consumed fish found ashore after a typhoon; some are sun-dried to lengthen shelf life</p>

**Table 2 (continuation).** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Irosin	Typhoons  the dry season would begin in March which is one month earlier than usual; the rainy season would already come before June and extend up to February once, a typhoon came during Flores de Mayo	ducks fly rather low than their usual	a reddish sky in the late afternoon	families with houses made of light materials seek temporary shelter in designated evacuation centers food packs were provided to families who evacuated; usually contained rice, sardines, sugar, biscuits, and water

**Table 2 (continuation).** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Santa Magdalena	Typhoons	ducks soar high  a large group of fireflies (aninipot) enter households	the shift to Habagat, the wind coming from the mountain side, brings heavy rains that cause flooding in their area  a rapid shifting of wind speed, from weak to strong then weak again (referred to as kanaway) brings about heavy rains  finding a fallen tree even without a strong wind or any other related event to cause it  finding a stalk of coconut leaves that falls and gets stuck on the ground in an upright position  thickening seaweeds in the river river would smell fishy	farmers removed the leaves of their crops to prevent the stalks from breaking or getting uprooted altogether  men helped each other in tying their houses to the ground  household members gathered and stayed underneath tables during the typhoon  some families evacuate to safer places e.g., local elementary school, bigger and stronger homes preemptive evacuation was implemented in compliance with RA 10121  the local government unit distributed relief goods to families in the evacuation centers  housing materials had been solicited from NGOs and distributed to families whose houses had been greatly affected by disasters; home repairs were facilitated which in turn shorten their stay in temporary shelters  a religious group provided clothes, rice, and other items which augment the basic needs of the families during crisis  DARO offered replacement seedlings to aid in the recovery of crop production like rice, corn, and pili

**Table 2 (continuation).** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Prieto Diaz	<p data-bbox="304 454 499 475">Drought</p> <p data-bbox="304 518 681 632">happened in 1980s</p> <p data-bbox="304 661 681 889">the mountains were reddish brown since the leaves of most of the trees had dried up and appeared burnt; nothing green could be seen</p> <p data-bbox="304 675 681 889">lasted for around three months, that hampered two rice planting seasons for that year resulted in a long duration of food scarcity in and around the municipality, which everyone remembered as a time of “grabeng pagtios” (extreme suffering)</p>			<p data-bbox="1346 389 1907 475">consumed alternative sources of food such as corn (<i>mais</i>), sweet potato (<i>kamote</i>), cassava (<i>balingoy</i>), and five fingers (<i>lima-lima</i>).</p> <p data-bbox="1346 518 1649 539">produced egg noodles (<i>bihon</i>)</p> <p data-bbox="1346 582 1800 604">government supplied bulgur wheat (<i>burgur</i>)</p> <p data-bbox="1346 646 1907 704">discovered processing and storage of intoxicating yam (<i>namo</i>)</p>
Santa Magdalena	<p data-bbox="304 946 681 996">all trees in the mountains went dry; a forest fire even occurred</p> <p data-bbox="304 1039 681 1089">affected rice production for a long period of time</p> <p data-bbox="304 1132 489 1153">happened in 1983</p>			<p data-bbox="1346 946 1907 1032">consume food alternatives like swamp taro (palauan, galyang), cassava (<i>balingoy</i>), sweet potato (<i>kamote</i>), and intoxicating yam (<i>namo</i>)</p> <p data-bbox="1346 1075 1907 1132">namo was the last to be consumed due to the tedious preparation</p> <p data-bbox="1346 1168 1907 1192">associated with hunger, i.e. “Pag tag-namo, tag hirap”</p>



**Table 2 (continuation).** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Casiguran	<p>Storm surge refers to the abnormal rise in sea level that occurs during tropical cyclones (DOST PAG-ASA, n.d.)</p> <p>caused multidimension-al problems to this area after it left severe flooding and destruction of different structures, buildings, crops, and livestock, and had even claimed lives</p>	<p>when the moon lacks luminosity, most especially when a halo surrounds it in its full phase</p>		<p>bayabay was already practiced before the 1970s in Bgy. Central</p> <p>a person goes around the village on foot, striking a stick on an improvised tin can several times</p> <p>residents would gather around the plaza to hear important announcements from the <i>teniente del barrio</i> (chief of police) regarding an impending disaster, among others</p> <p>the parish priest and his sacristan would ring the church bell continuously for 10 minutes (<i>kalembang</i>) while the bayabay is being done</p> <p>heavy materials on roofs are placed, e.g., old tires or sacks filled with sand</p> <p>seek shelter in warehouses or bigger homes</p> <p>fixed breakwater has been built to protect houses near the shoreline</p> <p>mangrove forests as additional barrier from the sea</p> <p>Bantay Dagat volunteers facilitate the dissemination of information</p>

**Table 2 (continuation).** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Irosin	<p>Volcanic eruption the explosion of the Bulusan volcano on Feb. 21, 2011 produced a grayish ash column that rose to a height of about three kilometers above the summit and blanketed the areas to the southwest reaching as far as Masbate Island (2013 CLUP of Irosin)</p> <p>lahar that flows from ash explosions are mainly confined to gullies at the slopes of the volcano that spill down to the dry creeks of this barangay, as well as to Cogon, Gulang- gulang, Monbon, and Patag (2013 CLUP of Irosin)</p> <p>with each eruption, a strong gush of a very large amount of water with large stones would flow through the gullies</p> <p>after more than a dozen recorded eruptions, the repetitive massive force had carved these gullies into deep and barren canals (kale-kale) four-kilometer radius as permanent danger zone</p>	<p>wild pigs (i.e., Philippine Warty Pig), deers (i.e., Philippine Brown Deer), birds (i.e., Philippine Hawk Eagle, Flame-breasted Fruit Dove), and snakes (i.e., White Spotted Cat Snake) (LGU Irosin, 2017; Binaday, et.al., 2017) would be seen coming down the slopes of the mountain</p> <p>they are assumed to see lightning (kikilat) and feel tremors (linog) caused by the underground volcanic activity which make them restless and leave their natural habitats</p>	<p>when a full-grown tree falls in a gully without any force to cause it</p> <p>more significant when it is followed by a strong flow of water</p> <p>during an eruption, the skies turn dark brought by the heavy ash fall; loud intermittent rumbling noise would be heard for around 15 minutes</p> <p>this sequence of events is an indication for people to seek shelter and protect lives and properties in an urgent manner</p>	<p>batingting or bells, located at the church and in the school of Bgy. Talistison, are rung by designated persons</p> <p>some families stay home; they get inside mosquito nets and cover their mouths and noses with wet pieces of cloth</p> <p>those who evacuate do so when the eruption is imminent, just before the typical lava starts spewing and the ashes start to fall heavily; they bring clothes and other basic necessities with them; they seek shelter in the barangay hall or in a privately owned warehouse</p> <p>after the ash fall, aluminum rooftops are washed out with water to avoid corrosion and eventual destruction of their homes; rains after a volcanic eruption are helpful</p>

**Table 2 (continuation).** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Irosin	<p>Flash floods</p> <p>due to gullies that have significantly become shallow recently with the deposition of rocks and other volcanic debris over the years</p> <p>occur in the different towns along its path, including Bgy. Mapaso</p>		<p>observe for rise of the water level and hear a particular noise in the river</p>	<p>check the water level; use flashlights at night</p> <p>residents pack their basic necessities and important documents in bags or boxes that are accessible during an evacuation</p> <p>barangay officials fetch and assist affected families and bring them to the barangay hall</p>

**Table 2 (continuation).** Inventory of Indigenous Knowledge for Disaster Risk Reduction and Climate Change Adaptation, Sorsogon, Philippines

Municipality	Type of disaster	Early signs from animal behaviors	Early signs from the environment	Survival practices
Santa Magdalena	<p>Flooding</p> <p>the river would be filled up easily by rainwater even without a typhoon which would isolate the community for several days</p>			<p>consume food alternatives like swamp taro (palauan, galyang), cassava (balingoy), sweet potato (kamote), and intoxicating yam (namo)</p> <p>namo was the last to be consumed due to the tedious preparation</p> <p>associated with hunger, i.e. “Pag tag-namo, tag hirap”</p> <p>people only have the following to eat: sweet potato (kamote) and cassava (balingoy), shrimps (pukot), and snails (susong)</p> <p>the spillway resolved the problem which provided a route for the heavy downpour of rains</p>
	<p>happened in 1974 and recently in 2014</p>			

## Conclusion and Recommendations

This study showcased various indigenous knowledge in the four municipalities of Sorsogon, namely, Prieto Diaz, Casiguran, Irosin, and Santa Magdalena. They were used in DRRM and have helped these areas survive multidimensional destructions brought by droughts, typhoons, storm surges, floods, and volcanic eruptions. The collection of indigenous knowledge, such as this inventory, is significant in contemporary times to further disseminate people's patterns of livelihood and manifestations of resilience. As a baseline, it could enhance provincial-wide mitigation strategies as mandated by Republic Act No. 10121 with high considerations for culturally-appropriate policies that acknowledge people's ability to transfer knowledge within and between generations.

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