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IVATAN INDIGENOUS KNOWLEDGE, CLASSIFICATORY SYSTEMS, AND RISK REDUCTION PRACTICES

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ABSTRACT – The paper aims to offer an emic perspective of Ivatan indigenous knowledge, classificatory systems, and risk reduction practices. It is based on primary data gathered through fieldwork in Basco and Ivana in Batan Island and in Chavayan in Sabtang Island in 2011-13 and 2017. Classificatory systems are ways of recognizing, differentiating, understanding, and categorizing ideas, objects, and practices. Ivatan classificatory systems are ecological and agrometeorological in nature. The distinction that they make between good and bad weather and good and bad times manifest binary, oppositional logic. Notions of bad weather and bad times are emphasized more than the good ones because of the risks involved. They are products of observations and experiences evolved over time in an environment that is prone to disasters because of its geomorphology, location, and practices. They are used in everyday life and during disasters, and always adapted to new knowledge and practices for survival.

Keywords: classificatory system, disaster, emic perspective, indigenous knowledge, risk reduction practices

INTRODUCTION

Knowledge is either modem or indigenous. Modern denotes 'scientific' based on Western epistemology (Collins, 1983), while indigenous denotes 'traditional', 'local', and 'environmental' (Anuradha, 1998; Briggs and Sharp, 2004; Chesterfield and Ruddle, 1979; Morris, 2010; Tong, 2010). Thus, indigenous knowledge (IK) is synonymous with traditional knowledge (Anuradha, 1998; Brodt, 2001; Doxtater, 2004; Ellen and Harris, 1997; Sillitoe, 1998), local knowledge (Morris, 2010; Palmer and Wadley, 2007), and environmental knowledge (Ellen and Harris, 1997; Hunn et al., 2003).

IK is given to several definitions, three of which need mention. WIPO (1998-1999) refers to IK as "creations, innovations and cultural expressions which: have generally been transmitted from generation to generation; are generally regarded as pertaining to a particular people or its territory; and, are constantly evolving in response to a changing environment" (p. 25). Abele (1977) refers to IK as the "[k]nowledge and values which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another" (p. iii). Morris (2010) considers IK "the knowledge that ordinary people have of their local environment: environs meaning what is around us" (p. 2).

IK is oral, informal, uncodified (Abele, 1977; Barth, 1999), and particular to a group (Morris, 2010) whose members know and practice it (Barth, 1995). It is based on observations of and living in a particular environment (Frake, 1962; Sillitoe, 1998). It is used in everyday life and during disasters (Jacobs, 2005), and always adapted to new knowledge and practices for survival (Abele, 1977; Briggs and Sharp, 2004; Brodt, 2001).

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IK is either ecological or non-ecological (Morris, 2010; Stevenson, 1996). Weather, agriculture, landraces, and commercial or exotic species are ecological, while arts, folklore, and rituals are non-ecological (WIPO, 1998-1999). Agro-meteorological knowledge (TAK) is a category of IK about the weather applied in agriculture (Brodt, 2001; Chevalier, 1980; Dixon, et al., 2010; Dominguez and Kolm, 2005; Dove, 1985; Esteban, 2015; Huber and Pedersen, 1997; Thomson, 1948). It is "embodied in the technologies farmers now have at their disposal" (Anderson and Niaz, 1999, p. 338).

TAK applies more on swidden than lowland agriculture. The Hanunuos of Mindoro (Conklin, 1954, 1957), the Subanens of the Zamboanga Peninsula (Frake, 1962), the Bataks of Palawan (Eder, 1977; Warren, 1964, 1984), and the Tagbanwas of Palawan (Barrows, 1910; Conant, 1909; Esteban, 2015; Scebold, 2003), to mention only a few, still practice TAK in their swiddens. Swidden can be clearings in the forests that maybe new, old and left to fallow (Conklin, 1954, 1957; Frake, 1955), or permanent like those in Batanes (Hornedo 2000). Interestingly, home gardens in urban centers are also applications of TAK (Morris, 2010; Reyes-Garcia, et al., 2014).

IK research used to be called 'folk taxonomy' (Berlin, Breedlove, and Raven, 1968; Conklin, 1954, 1957; Esteban 2015) or 'ethno-ecology' (Eder 1977; Esteban, 2015; Frake, 1955). It has deep roots in indigenous epistemology (Fox 1995) or 'anthropology of knowledge' as we call it here. It has been with us for decades (Conklin, 1954, 1957; Dove, 1985; Frake, 1955; Warren, 1964, 1984). The surge in IK research, though, is new. It is a response to the creation of the UN Permanent Forum on Indigenous Issues since 2000 (UN, ESC, PFII, 2000; UNESCO Jakarta, RSBAP, 2018).

Scholars recognize the importance of IK in development and conservation around the world (Madegowda, 2009; Morris, 2010; Spak, 2005) for at least four reasons. First, IK is a communal resource that helps alleviate rural poverty (Johnson, 1992; Wilson, 2004). It contributes to higher yields in Java (Dove, 1985), while poor harvests in Pakistan are an effect of the erosion of IK (Anderson and Niaz, 1999). Second, it involves a 'conservation ethic' that informs conservation policy, practice, and reforms (Ellis 2005; Robbins 2003; Morris, 2010). Third, it assuages a sense of culture loss in the face of rapid change in territories inhabited by Indigenous like the Tlingit of Alaska (Hunn et al., 2003) and the Indians of the Yucatan Peninsula (Haenn, 2002). Fourth, the recognition of IK guarantees the rights of Indigenous Peoples to communal resource from poaching by others (Sahai, 1996).

Batanes and the Ivatans do not figure prominently in Philippine economy, politics, and culture. Batanes, though, has a peculiar place in tourism and research. Local and foreign tourists consider the scenery, the people, the history, and the culture of Batanes interesting. This makes the islands an important tourist destination in northern Philippines after Baguio City. Scholars consider Batanes important in relation to Austronesian studies. Archeological studies in Batanes have informed our understanding of how the Austronesians peopled the Philippines, Oceania, Southeast Asia, and the Indian Ocean (Bellwood and Dizon, 2005; Dizon and Santiago, 1996). Linguistic studies in Batanes have enriched our understanding of the Austronesian language family (Tsuchida, 1989; Yamada, 1998).

Experts consider Batanes important in disaster studies because of its location in the Pacific Ring of Fire (Oppenheimer 1996) and the Western Pacific typhoon belt (ESCAP/WMO, 2016). Disaster studies in Batanes have contributed to our understanding of the nature of IK and its relevance to disaster

risk management (Blolong, 1996; de Ocampo, 1994; Oliver-Smith, 1979). The twinning of disaster with IK, though, is recent. It is a reaction to the alarm that global warming and its effects raise in tropical island worlds (Ulph and Ulph, 1997; Webster, Holland, Curry, and Chang, 2005).

The idea that there is a living tradition of IK relating to disaster in Batanes is based on notions of the ordinariness' of disaster in the archipelago because of its geomorphology and location. The paper aims to offer an emic view of Ivatan IK, classificatory systems, and risk reduction practices. It hopes to contribute to literature on disaster that articulates the emic or native perspective (Morey and Luthans, 1984; Olive, 2014). This is in contrast to the etic perspective that privileges the point of view of the researcher that is encountered in most classificatory systems studies from around the world (Bharati, 2018).

METHODOLOGY

The paper is based on primary data obtained through fieldwork in Basco and Ivana in Batan Island and Chavayan in Sabtang Island in 2011-13 and 2017. The data gathering approaches involved participant observation, talk (*kuwentuhan*) with informants, and documentary analysis. The daily schedule was kept in a journal, and the field notes were kept to record the observations, reflections, and insights. Pictures, maps, and secondary literature supplement the primary data.

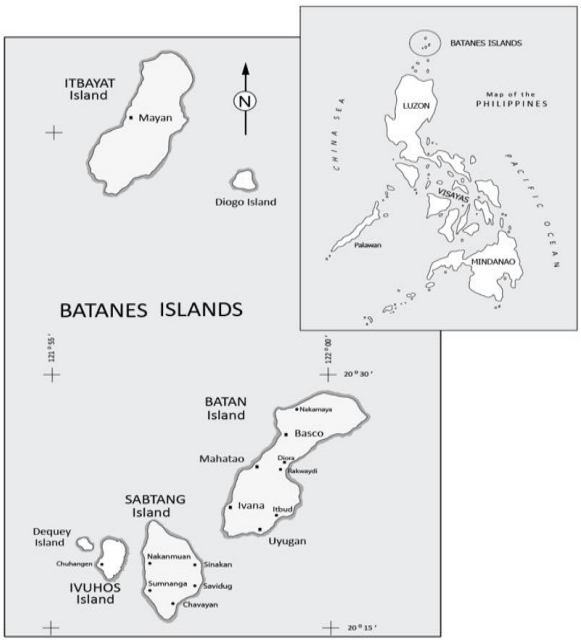

Figure 1. Map of Batanes Islands showing Basco and Ivana in Batan Island and Chavayan in Sabtang Island. Modified from Mt. Iraya. volcanodiscoverycom. Accessed 12 May 2018.

Batanes is the northernmost province in Region II or Cagayan Valley. It is located at longitude 121° 53' East and at latitude 22° 20' North. The Pacific Ocean borders it on the East, the South China Sea on the West, the Bashii Channel on the North, and the Balintang Channel on the South. The Bashii Channel separates it from Taiwan and the Balintang Channel from Luzon (Alexander, 1992). Batanes is 860 kilometers north of Manila, 200 kilometers south of Taiwan, and 150 kilometers north of Tuguegarao, Cagayan.

Batanes is the smallest province in the Philippines with a total land area of only 230 square kilometers. It is composed of the ten islands of Itbayat, Batan, Sabtang, Dinem, Siayan, Ditarem, Misanga, Mavudis, Dequey, and Vuhus. The islands are volcanic in origin, except Itbayat that is an effect of coral uplift. Mt. Iraya is a live volcano that dominates the landscape north of Batan (de Ocampo, 1994; Maryannick et al., 1986).

Batanes has an extensive seascape because of its archipelagic topography. The waters surrounding the islands are a major fishing ground in the country (Morales et al., 2016). The fishing ground is estimated at around 23,000 square kilometers of open sea (DA-BFAR R02, 2006). It extends 160 kilometers to the South China Sea, 200 kilometers to the Pacific Ocean, and 112 kilometers to the Bashii Channel.

The climate is subtropical, resembling that of southern Taiwan and Okinawa. There is no sharp distinction between the wet and dry season, and precipitation is evenly distributed all year round. The temperature can drop to 13°C or lower during the cold months from December to February. Fog can last up to four days, and visibility can be low on land and at sea. Rains can be ample, winds strong, and seas choppy during the Southwestern monsoon. The summers can be dry, hot, and humid.

Figure 2. Batan Island, Mt. Iraya at a distance. Photo by EA Valientes.

The population is around 16,604 (PSA, 2010). It is distributed, as follows: Basco, 7,907; Itbayat, 2,988; Sabtang, 1,637; Mahatao, 1,583; Ivana, 1,249; and Uyugan, 1240. The indigenous Ivatans compose 96% of the population, while the Ilocanos, Tagalogs, and other migrants, compose 4% (PSA, 2005). The relatively small population is probably due to low fertility and high outmigration to Luzon for work.

Agriculture is the major industry (Hornedo, 2000), followed by fishing (Morales, Encarnacion, and Calicdan, 2016). Despite the importance of fishing, the products that are traded outside the islands are only garlic and cattle (PSA, 2005). Employment in the civil service and remittances from work overseas help generate income for many families (PSA, 2005).

The remainder of the paper is divided into two sections. The first discusses the findings that center on traditional Ivatan life, history of disaster, Ivatan classificatory systems, and risk reduction practices. The second discusses some key issues arising from the findings. A map of Batanes and select photographs are provided for illustration.

RESULTS AND DISCUSSION

The Land. The terrain of Batanes is a result of volcanic and coral formation since the Pliocene. It varies from undulant hills, inclines, and rises to shorelines that maybe of sand, pebble, rock, or boulder. There are no rivers, mangroves, lakes, swamps, or mudflats. The gullies that collect water during the typhoon months dry up quickly during the dry season. Natural drainage is efficient because of the hilly terrain. This, however, aggravates poor soil quality, mineral loss, and erosion with each downpour. Poor soil quality has led to the appearance of grassland (*panyavutan*) composed mostly of cogon (Imperata cylindrical) and culms (*vyawu*, *viyawo*, Miscanthus floridulus) (Castillo, 1961; Frake, 1955). Intensive, long-term grazing can prevent the emergence of tree species that can develop into forests such as found on Mt. Iraya (Watkinson and Ormerod, 2001).

Settlement buildup, permanent swiddens, grazing, and the exploitation of forest for boat-making, house-building, and fuel for cooking and smoking fish and meats would explain the creation and persistence of a landscape associated with Batanes. The landscape is an effect of the quilt-like pattern that the yam fields, grasslands, settlements, and mountains form. Dampier (1927) did not find the landscape scenic in the 1687. It is for this reason that we theorize that it is manmade and probably dates back to the 1700s or even later. Thus we posit that the landscape of is manmade. It is a result of the combination of such factors as the invasion of open and idle lands with poor soil quality by cogon and culms, settlement buildup, permanent swiddens, deforestation, and intensive, long-term grazing.

The People. The ancestors of the Ivatans are believed to have arrived in Batanes at around 4,000 B.C.E. (Bellwood and Dizon, 2005). The name of the group is derived from *i-batan*, meaning “from Batan”. The autonym is Chirin nu Ibatan (Ethnologue, s.v., Ivatan), so it is likely that Ivatan is an ascription, a name given by outsiders to the group. They speak an Austronesian language of same name (Llamzon, 1978; Tsuchida, 1989). Ivatan is one of three Bashiic languages, the other two are Ibatan in the Babuyan Islands and Yami in Taiwan (Ethnologue, s.v. Bashiic). The dialects are Itbayaten (Itbayat), Basco Ivatan, and Southern Ivatan (Ethnologue, s.v. Ivatan). The Ivatans are a group-conscious people. They call the non-Ivatans among them “*i-pula*”, meaning “migrants”, “outsiders”. Majority of the population live in the four towns of Basco (Vasay), Mahatao, Ivana, and Uyugan in Batan Island, and the rest in the two island municipalities of Itbayat and Sabtang.

Cultivars. The traditional economy is subsistence based on swidden, fishing, and a little trade. It is a way of life evolved through centuries of adaptation to an island environment that has limited carrying capacities for human settlement. Batanes is not a rice-growing province because of the absence of surface water and lack of land fit for paddy agriculture. The arable lands, though, are planted to various crops for most of the year. The fields are either left to follow or in different stages of cultivation, growth, and maturation.

Yams, sweet potato (*wakay*, Ipomoea batatas), and taro (*sudi*, Colocasia esculenta) are the most important of food crops. The winged yam (Mignouna, 2003) called *uvi* (Discorea alata) and Chinese yam (*dukay*, Dioscorea polystachya) that the Tagalogs call *tugui* (Blolong, 1996; Hornedo, 2000) are the two species of yams widely propagated. The people used to rely on these yams (Hornedo, 2000) that provided them carbohydrates, some protein, and such minerals as potassium and phosphorus. These yams are reliable food sources because they preserve well, lasting up to seven months without refrigeration (CGIAR, 2006; White, 2003). A variety of fruits, vegetables, and spices are also grown. Garlic (*bawang*, Allium sativum), onion (*bulyas*, Allium cepa), and ginger (*anaha*, Zingiber oficionale) are raised for the table and the market. Garlic is still an important source of income despite cheap imports since the 1980s.

The farmers are not known to fertilize their fields. Cattle and goats range freely in pastures that may be communal (*pawalan*), government-designated (*payawan*), or private. Grazing cattle and goats in the fields during the furlough appears to be the local manuring practice. Culms are planted in between the yam fields (*hakawan*) to define plots, control erosion, deter cogon invasion, and protect the crops against strong winds. Shrubs, small trees, and culms are planted along gulches to help control erosion, to form fences and boundaries, and to serve as windbreakers. The *pandanus* (sp. tictorius) that thrives on sandy shores help break the waves during the stormy months.

The traditional daily food is simple, consisting mainly of root crops and catch from the sea. However, since the 1980s, rice has replaced root crops as staple because of higher income and rice trade with Manila and Cagayan. Consequently, the Ivatans consider root crops 'lowly' food and eat them only occasionally now. Meat is not every day fare. It is relished during weddings, wakes, christenings, and other gatherings of family, relatives, and friends. Meat from landraces of cattle, goats, hogs, and fowls are preferred over others for its taste.

Farm Animals. Cows, carabaos, goats, pigs, and chickens are common farm animals. Goatherds were ubiquitous in Sabtang by the seventeenth century (Dampier, 1927). Since they were first domesticated in Iran (Naderi et al., 2008), we theorize that goats were introduced in Batanes prior to the 1500s. Hogs were backyard domesticates in the past that are now raised away from the villages for health reasons. Besides taste, landraces are preferred over others because they are cheaper to grow, they are more resistant to disease, and they fetch good prices in the market. Cattle remain an important source of income despite cheap imports of beef since the 1980s.

Fishing. Life is sustained more by swidden than fishing and trading. This is despite the fact that the fishing ground of Batanes is bigger than all its arable lands combined. This is due to the persistence of traditional technologies employed in open sea fishing (Morales, Encarnacion, and Calicdan, 2016). Shellfish gathering (*manaw*), spear-fishing (*mamana*), net fishing (*managap*, *manawuy*, *manakdit*), and long line fishing (*manayrin*, *mayavavang*) are some of these technologies. Fish is relished for soups and as accompaniment to rice and root crops. The most important fish product is *pawpaw* that is made of dorado dried and smoked to last longer and for taste. It is a status food, reserved for dire times, and never traded.

Figure 3. *Uvi* (*Discorea alata*). Photo by EA Valientes

Fishing involves the use of *cascos* (Fig. 4). Writing in 1687, Dampier noted that the casco is a plank boat that rows from twelve to fourteen oars and carries from forty to fifty passengers. The forests furnish timber for these cascos that are also used for travel and trade. The casco has changed little since Dampier wrote about it in 1687. He observed that the people did little fishing. This was expected because they arrived and left at the time of the year when the fish harvests had been processed, cured, and stored for use during the lean season (Mangahas, 1993).

Figure 4. *Casco*. Photo by EA Valientes.

Trade. Dampier (1927) noted that the Ivatans produced abundant yams, sweet potatoes, bananas, and pineapples for the table and trade, but they had no rice and corn for food and fowl and hogs. Hogs and goats were plentiful, fat, and savory, but there were no cattle and other large farm animals. Thus, we theorize that cattle and carabaos were introduced in Batanes after the 1600s. The Ivatans traded farm products for iron that was fashioned into farm tools and spear points (Dampier, 1927). The spear was the commonplace weapon against local enemies and pirates who were known to visit the islands in the past.

The Ivatans had contacts with the outside world. Evidences of such contacts include nephrite *ling-ling-o*. Since there is no local source of nephrite in Batanes, the nephrite ling-ling-o could have come only from outside through trade. Studies of these objects of trade would show that they probably came from Fengtian, Taiwan (IIzuka, Siao-Chun, and Bellwood, 2007). Some of these ornaments were made of alloy that shone like gold when burnished using red clay (Dampier, 1927).

Some of the crops grown in Batanes also indicate contacts with outsiders. Pineapple, though, is the first bromeliad from South American that spread to many parts of the world since the turn of the 1400s. The Spaniards introduced pineapple in the Philippine during the second half of the 1500s and next to Hawaii and Guam (Morton, 1987). Thus we theorize that the Ivatans acquired pineapple through contacts with communities in northern Luzon that grew the plant before the 1600s. Sweet potato is a South American plant. It is known, though, that the Hawaiians grew sweet potato prior to Spanish contacts (Chung, 1923), probably as early as 1,000 A.C.E (*Pittsburg Magazine*, 2008). It is possible that the sweet potato was a commonplace in the Philippines, including Batanes, before the 1500s. However, it is also likely that the Spaniards brought the plant to the Philippines.

Pottery also attests to contacts between Batanes and Luzon. The Ivatans were known to make earthen wares for kitchen use that represents a recent, small, and conservative industry (Laetsch, 1972; Scheans and Laetsch, 1981). It is likely that the industry is indigenous. But did the Ivatans produce stoneware? It is generally held that the Ivatans acquired the *burnay* (stoneware) from Ilocos to store *basi*. In regard *basi*, however, Dampier (1927) noted that the Ivatans produced a lot of basi from sugar cane and stored it in jars made of stoneware. This revises the old view that basi was acquired through trade with Ilocos. We posit that the Ivatans grew sugar cane and produced basi, including a brew known only to Batanes (Dampier, 1927).

Disaster History

More commonly, disaster refers to a sudden calamitous event that causes great damage, loss, or destruction on the people and the environment. They may be seismic or climatic in origin. The seismic include volcanic activity, tsunamis, and earthquakes, while the climatic includes flashfloods and typhoons. They maybe also manmade, e.g., disastrous fires, whose causes and effects are influenced by cultural practices (Bankoff, 2003; Hoffman and Oliver-Smith, 2003).

Volcanic Eruptions. Batan presents an important example of how cataclysms lead to disasters. The island is formed by two extinct volcanos and one active (Maryannick et al., 1986) that belong to the Babuyan segment (Defant, et al., 1989). Mt. Mahatao is a collapsed, dissected volcano that forms the central land mass of the island, while Mt. Matarem is an extinct volcano on the southeast (Arai, et al., 2004); Defant et al., 1989). Mahatao was active during the Miocene (ca. 5 million years ago), while Matarem was active until the early Pleistocene (ca. 2 million years ago) (Arai et al., 2004; Defant et al., 1989; Maryannick et al., 1986).

Mt. Iraya that rises up to 1,011 meters above sea level is only eight kilometers from Basco. It is a stratovolcano that is transitioning from effusive to pyroclastic activity since the late Pliocene (Maryannick et al., 1986). The cone at the summit is a younger formation inside an old crater that is 1.5 kilometers in width (volcanodiscovry.com., 2018). It is known to have erupted in historical times. It erupted in 470 A.C.E., and its lava flows reached Songsong bay on the northwest. It also erupted in 760 and in 650 A.C.E. (Maryannick et a1., 1986). These eruptions happened a long time ago that the Ivatans do not remember them anymore. Seismic storms were reported in 1998 (volcanodiscovery.com),

prompting the government to set up stations at the crater and in San Roque. The station at the crater had been abandoned since, while the station in Batan still monitors the activity of the volcano.

Tsunamis. Tsunamis may accompany strong earthquakes (Brearley, 2005). The huge tsunami that struck Songsong in 1953 destroyed the entire village. None perished because the villagers were quick to escape to the hills at the first signs of the tsunami. Songsong was abandoned after the disaster, and it remains uninhabited today. It is listed as a tourist attraction. Tourist who include northwestern Batan in their itinerary visit the ruins that still stand by the roadside. Interestingly, some survivors of the tsunami and their descendants have been visiting Songsong for more than a decade now.

The government tried to help the inhabitants of Songsong by offering to resettle them in Mindanao. The offer coincided with the resettlement project of the Magsaysay government in Mindanao in the 1950s (Abaya-Ulindang, 2015). Magsaysay's resettlement project aimed to provide a new life to the agrarian poor in areas where the communist insurgency used to be strong. It is not known if all the inhabitants of Songsong left for Mindanao, but many did. This corrects the mistaken notion that the Ivatans were indigenous to Bukidnon and adjacent areas.

In Kalilangan, Bukidnon, 6% of the population is Itbayat or Ivatan (PSA, 2015). Kalilangan used to be part of Pangantucan, Bukidnon. The arrival of the settlers under the National Resettlement and Rehabilitation Administration spurred a sudden increase in population that led to the creation of Kalilangan as a separate municipality. There is also a community of Ivatans in Bumbaran, Lanao del Sur.[1] They live in Frankfort, the center of the town, adjacent their fields. The Ivatans and Ilongos compose the majority of the Christian population of the town. It appears that the core Ivatan population in Bumbaran were also from Songsong. Bumbaran, now Amai Manabilang, is a new municipality located between Bukidnon, Cotabato, and Lanao del Sur.

The Ivatans have little understanding of tsunamis. When a strong earthquake struck Batanes in 2001, they abandoned their houses and moved to the beach for safety instead of withdrawing to the hills. This has changed, though, since the 2011 tsunami in Japan that they saw on television. Batanes received warnings when a huge tsunami struck Japan in 2011, in the wake of a 9.2 offshore earthquake (Okada, 2011). The local government promptly ordered the evacuation of coastal villages. The inhabitants of Chavayan withdrew to the nearby hills, while those of Ivana stayed with relatives whose houses were located on higher grounds. They went back home only after the government had lifted the warning.

Flashfloods. Flashfloods happen when water on low-lying ground rises fast and without warning. Slow-moving thunderstorms or heavy rains during storms cause flashfloods (Lazarus, et al., 2016). Flashfloods are rare in Batanes. The hilly terrain and the presence of gullies are contributory factors to flashfloods during downpours. Heavy rains in 1998 caused a flashflood that killed scores of farm animals. It also destroyed roads and bridges, including the San Vicente Bridge in Ivana and other structures that date back to the Spanish period.

Typhoons. Typhoons or storms are cyclonic phenomena characterized by heavy rains and strong winds (Clayton, 1896; Smithson, 1993). An average of eight typhoons strike Batanes every year from July to October. The Ivatans distinguish a weak typhoon (*fiisu*) from a strong one (*afiin*). Those that happen in December are rare but strong, while the rest of the year is typhoon free. Neneng, known by its international codename Kinna (Rudolph and Ground, 1991), struck Batanes in 1991. It destroyed sea walls, damaged crops, and wrecked houses and government buildings. In Batan, it smashed against the

rocks LST, a ship loaded with construction supplies and other cargoes. The Ivatans observe that fewer, weaker typhoons slam against Batanes from April to December today. They call these "banana typhoons" because they only destroy banana hills. They consider the phenomenon an effect of climate change that they learn about in schools and on radio and television.

Classificatory Systems

Classificatory system is a process whereby ideas, objects, and practices are recognized, differentiated, understood, and categorized (Berlin, et al., 1968; Conklin 1954; Esteban, 2015; Frake 1955). It is either emic or etic (Morey and Luthans, 1984; Olive, 2014). The paper pursues the emic approach that focuses on Ivatan TAK in everyday life and during disasters. In Ivatan TAK, weather and its effects are either good or bad.

Good Weather. Weather refers to daily atmospheric conditions, while climate refers to year round conditions (Larson and Lorengel II, 2014). The Ivatans, however, do not make such distinctions. They refer to atmospheric conditions *kawan* (weather), which is good if there is no typhoon and bad if there is. Good weather that can begin in January and last until June refers to typhoon-free season, while bad weather that can begin in July and last up to December refers to typhoon season.

The weather can oscillate from good to bad, vice-versa, during and in between the seasons. The Itbayat refer only to good weather (*mavid a kawan*, *mahteng*, Yamada, 1998). Good weather describes a time of year that is dry and sunny. It is time to work the fields because the footpaths are safe, the soil is easy to till, and the crops can flourish in the sun. It is also a time for open sea fishing and interisland travel. Good weather promises bountiful harvests on land and sea.

The Ivatans have a keen sense of weather signs. Such minute details as the color of the sky and the behavior of domesticates and wild animals are observed for the signs that they foretell about the weather (Yamada, 1998). Blood-red sunsets and chickens calling out at night or at dawn mean good weather. Jumping dolphins (*lumba-lumba*) mean prevailing good weather or the weather can change from bad to good or from good to better. Swarms of ants (*vuxaho*) and mosquitos (*tamuneng*) mean that the weather can change from bad to good or from good to bad.

Bad Weather. Mayan in Itbayat is the reference point in foretelling the movement of wind systems. A wind that blows clockwise means good weather, while a wind that blows counterclockwise means bad weather. Weather is bad (*maharet a kawan*) because of wind, rain, fog, and typhoon that cause damage on crops, animals, and houses. The dry, hot, prevailing Westerlies (*salawsaw*) are bad because they can parch the crops and prevent them from maturing and producing yields. A house lizard (*geget*, Hamidactylus frenatus) or flying gecko (Ptychozoon kuhli) that cries out at the southern corner of the house means that the Westerlies are blowing. The anxiety that these winds causes eases only when scattered clouds (*laaro*) appear and signal the arrival of the Southwestern monsoon.

The Southwestern monsoon blows from sea to land carrying more moisture and rain than the Northeastern monsoon (Crow, 1949). It coincides with the typhoon season. Storms bring rain (*chimuy*), squally seas, and cold and wet days that impede sea travel and delay farm work. The paths that lead to the fields are slippery (*marakpes*) after a storm, and the pasty soil is difficult to work. Continuous, heavy rains mean low income due to crop rot or pestilence. Rescuing and feeding cattle and goats that have taken refuge in bushes, rock shelters, and caves are risky and arduous tasks to do in heavy rain. Worse, farm animals that are sensitive to rain, especially goats, can get sick and die.

The people stargaze for weather signs at night when the skies are clear. Distant, twinkling stars mean that the rainy season is coming. As the season approaches, the following sings foretell rain and its intensity: a rainbow for short and light rain; dark clouds (*inavung*) for moderate rain; and yellow clouds during sunset for heavy rain (*mawyas a chimuy*). Fog (*kahehep*) is common during the rainy, cold season. A fog that lasts from three to four days forecasts rain or a weather turning from bad to worse. The phenomenon is partly influenced by the condition of the seas that surround Batanes.

It is believed that animals can sense early signs of earthquakes ahead of humans. That they can sense not only the earth's vibrations but also the gasses that the earth releases during earthquakes (USDI, GS-EHP, n.d.). The causal relations between animal signs and earthquakes, though, remain unreproducible. Nonetheless, the Ivatans believe that the behavior of animals foretells the weather based on experience. Rain is coming when a house lizard or flying gecko cries out from any side of the house, or when a species of ants (*buhawu*) come out from their hiding places and seek out new ones. Rain is also coming when a rooster (*savungan*) crows late at night or when hens squawk at night.

Unlike animal signs, the bases for the belief in plant signs and weather signaling appear to be strong. Changes in the morphology and phenological states, e.g., fruitfulness, of certain plants correlate with the weather conditions with high repeatability (Nedelcheva and Dogan, 2011). New leaves on *arius* (Podocarpus costalis), blooms on *raxayen* (Erythrina variegata), and the appearance of *tupu'tupu* (mushroom, Agaricus bisporus) hint the end of the dry Northeastern monsoon and the onset of the wet Southwestern monsoon. The first flowers of *chawi* (*chayi*, Pometia pinnata) foretell the start of the stormy months, and the fruitfulness of chawi indicates the height of the typhoon season.

After the onset of the stormy months, the sunsets are observed for storm signs. Cloud color, form, and direction are significant in forecasting storm. Red clouds on the north indicate bad weather deteriorating into a storm. Other signs include bright orange clouds, appearance and disappearance of red clouds (*raxagdag*), orange to brown clouds (*inavung*), streaks of black clouds on the horizon, and streaks of white clouds (*inavung*) on the north that resemble a broom made of mountain date palm fronds (*voyavoy*, Phoenix loureiroi). Unusual animal behavior also means approaching storm. Cockroaches (*ipes*) appearing in huge numbers and flying around, or cattle lying down on Daman'aato hill in the Sabas de Sagon pasture in Itbayat indicate that a storm is coming. A single thunder also foretells a storm.

Studies show that marine life responds to climate change (Poloczanska et al., 2016). However, does the behavior of marine organisms signal the weather of the day? Ivatan fishermen are as keen observers of weather signs as the farmers. Strong winds and big waves are expected when hermit crabs (*kuyad*, Pugaroidea) crawl out of their burrows for safer grounds. In addition to this, fishermen also scan the skies for physical signals. Scattered white clouds in the form of voyavoy brooms on the north hint blustery winds and rough seas (*mabkas*). A moon (*vuhan*) that appears with a bright halo suggests strong currents (*mariyes*). When a star appears on top or at the bottom of the moon a boat will capsize (*madubok*). The Ivatans swear to this by recounting every known accident at sea as foretold by such signs. They refrain from going out to sea when these signs appear.

Bad Times. Bad times is an effect of a combination of factors that may be weather, accident, or coincidence. Bad times include famine, epidemic, pestilence, and hazardous fire. Fears of famine (*kulay*, *tiempu nu kapaychapteng*) grip the Ivatans when a whale (*ruyung*) is stranded on the shore. They try their best to put it back to sea successfully to prevent famine. The worst is expected to come if it dies or when a dead one is washed on the shore. Famine is due to bad weather that leads to poor harvest and impedes relief from Manila or Cagayan. An earthquake (Hornedo, 2000), a landslide (Cataluña, 2001), or another disaster can trigger fears of famine.

The Ivatans believe that there is an epidemic that can strike only children. This suggests that infant mortality due to disease was high in the past. A swarm of white butterflies is unusual and considered a sign of epidemic that can strike only children, if not everyone. Newcastle disease is a kind of bird flu (Dudley, 2006) that is known to the Ivatans. It is not known if some Ivatans suffered from a case of avian flu. The pestilence is expected when chickens on the southern side of the village of Hiñato answer the caws of those on the northern side of the village. Dampier (1927) observed that there were few fowls in Batanes during the 1600s because the people did not produce grains for food and feeds. Since it was first observed in Indonesia in the 1920s (MacPherson 1956), Newcastle disease is a new epizootic that infects fowls in Batanes.

Disastrous fires used to be common in Batanes. A sole chicken cawing at dawn nine times means someone's house will catch fire. Fires like these can happen when children play with fire in or around smoke sheds made of thatch used for curing fish, meats, and tobacco. They happen towards the end of the dry season when harvests from land and sea are cured through drying and smoking. They usually happen in neighborhoods where the roofs of houses are made of thatch. Today, most Ivatans try to replace the thatch roofs with galvanized iron, concrete, or bricks for safety.

The sense of isolation due to distance from the mainland, treacherous sea passages, and stormy weather amplifies anxiety. When typhoons pommel the islands, the Ivatans fret about lack of communication with and transportation to and from the mainland. In Itbayat, the anxiety only eases when a sole chicken caws out at dawn from Kajijangan in Mayan or when a chicken squawks in an unusual time. The sign presages the arrival of a supply or relief boat from Manila or Cagayan.

Risk Reduction Practices

Risk reduction practices pertain to strategies that ensure survival during bad weather and bad times. They center on practices that include a strong and safe house, prognostication, food security, and other practices.

***House*.** The domicile is an artefact and the site and effect of continuous activity to make it more habitable and safe (Carsten and Hugh-Jones, 1995). Curiously, the traditional Ivatan house used to be speculated upon. The discovery of 'megaliths' on hilltops in Batan in the 1990s inspired opinions that these stones once served as house columns against strong winds (Dizon and Santiago, 1994). No such 'archeological house' or stone settlement on hilltops was discovered in Batanes. If there were, none existed by the 1600s (Dampier, 1927).

In 1687, Dampier (1927) noted that Batan, Itbayat, and Sabtang were well populated. The people lived in numerous villages located some distance from the fields like today. The Ivatan house was small, low, and made of wood and grass. The ridge poles were from seven to eight feet tall, the side poles were small and about four and a half feet tall, the walls were made of wattle, and the roofs were made of thatch. The hearth was located at the end of the house, and planks were lain on the ground to lie on. Three to four rows of houses composed a village, each separated by a narrow passage to which every door opened, and each linked by stairs that could be drawn up for safety. The villages were built at the edges of precipices, whose backs hang out to the sea, away from storms. They could only be reached by climbing up a perpendicular wall, not from the top or below.

It appears that Dampier (1927) was describing the jinjin that many poor Ivatans still make and live in today. The poster image of the Ivatan house, though, is the gada'gada, an eighteenth century Spanish influence. Made of stone and mortar, it is patterned after the churches, government buildings, and bridges

that were built in Cagayan Valley during the period (Hornedo, 2000). Masonry was part of the shift in architecture in the Philippines from structures made of *materiales ligeres* (light materials) to *materiales fuertes* (strong materials) as a safeguard against earthquakes and hazardous fires since the 1700s (Madrid, 2012).

The gada'gada is small, low, and made of corals and stones, poles, and thatch. Corals and stones gathered from the shore were put one on top of the other, held together by mortar for walls, and thatched with cogon or palm fronds. The walls are plastered with lime to seal the cracks and to give them a whitewash finish. The small windows and doors open to narrow passages, and the thatch roofs keep the interior cool during the hot months (*rayun*). The gada'gada is built to withstand typhoons, but the roof is easily blown off by strong winds and also prone to hazardous fires.

The gada'gada manifests the adaptive strategies that the Ivatans had developed in response to disasters. As an adaptation to hazardous fires, alleys (*panahanan*) that lead to the sea exist to help the villagers bring water from the sea to put off disastrous fires. Rows of gada'gadas form villages built on hillsides away from the fields. Following a strong earthquake in Batanes in 1918, the sides and walls of gada'gadas were reinforced with timber to make them bear tremors more. The thatch roofs are covered with nets strapped to the walls with ropes to keep them from being blown away during typhoons. The people stay inside their houses and desist from going to the fields, fishing, or travel during bad weather.

Figure 5. *Gada'gada*. Photo by EA Valientes.

Prognostication. The Ivatans were not known for their adherence to belief (Dampier, 1927), and they had no idols like those observed in rice-growing societies (Scott, 1982). Divination is an esoteric knowledge and practice that has survived from the past to the present (Werbner, 1973). It differs from everyday practice in that the search for signs is reserved to shamans that the community recognizes as such. The shaman, usually male, sacrifices a pig and examines its innards for ominous signs. The sign could be a cyst, kidney or gall stones, or anything that is unusual in the organs of the animal (Mangahas, 1993).

Launching a new casco requires divination (*sayang*) to know if it is safe to set it out to sea for fishing, travel, and trade (Mangahas, 1993). A pig is sacrificed to ascertain this. A white membrane enveloping the liver of the animal means unsafe voyage. Consequently, the casco would remain grounded until the signs are auspicious in the next divination.

***Food Security*.** Ensuring food for everyone during bad weather is a year round activity. Dried and smoked dorado (pawpaw), pork (*lunyis*), and cattle hide (*kuday-a-kudit*) are preserved through salting, drying, and smoking to make them last longer and for taste. By the end of the sunny months, every household has stocks of these food supplies and firewood to boil kuday-a-kudit until it is soft to eat. Taro, sweet potatoes, especially yams, are stocked for carbohydrates. In good times, the harvests from land and sea are ample (Dampier, 1927; Mangahas, 1993).

The preference for rice over root crops today can mean food shortages during disasters as happened in the past. In 2012, the typhoons that battered the islands prevented ships from Manila or Cagayan to supply the islands with rice for three months. Every one talked of possible hunger when the National Food Authority and private suppliers started to run out of rice. Chavayan was worst hit because almost half of the household had ran out of rice at the time. The sudden shift to root crops to stave off hunger caused indigestion among children. Notwithstanding this, the 'indigestion' could be soft fecal matter due to a high fiber diet made of root crops.

Fears of hunger only eased when the weather improved that made it possible for the government to supply Batanes with rice using the C-130 aircrafts of the Philippine Airforce. In fair weather, supply ships from Manila and Cagayan visit Batanes regularly. However, the Balintang Channel on the south is a dangerous choke point to cross in bad weather (Alexander, 1992). This helps explain delayed relief from Manila or Cagayan during disasters and the relative isolation of Batanes until historical. Although it is not known if Ivatan society faced famine in the past, it is possible that fears of famine are recent due to the shift from root crops to rice for food.

There is a flurry of activity as soon as the sun is up the morning after a typhoon. Villagers clean up their yards of such debris as fallen trees, branches, and leaves. Neighbors help one another in replacing blown-off roofs. Farmers set out to determine the damage that the typhoon caused on crops. They search the bushes, caves, and rock shelters to rescue live stocks that had taken refuge in these places during the storm. Fishermen look over their boats for damage. The people visit the chawi groves to gather the fruits that have fallen to the ground for their enjoyment. The coast is combed for wood that the typhoon brought for fuel, posts, lumber, and other uses. When the typhoon season ends in December, the people gather around to ease their anxieties by amusing themselves and inquiring from each other about houses, crops, live stocks, and other things, that interest them.

CONCLUSION

Classificatory systems are emic approaches toward organizing IK and making them useful in everyday life and during disasters. Ivatan classificatory systems are ecological (Ellen and Harris, 1997; Morris, 2010) and agrometeorological (Chevalier, 1980; Dixon et al., 2010; Dominguez and Kolm, 2005; Dove, 1985; Esteban, 2015; Pedersen, 1997; Thomson, 1948) in nature. The distinction that they make between good and bad weather and good and bad times manifest binary, oppositional logic (De Saussure, 1977). Notions of bad weather and bad times are emphasized more than good weather and good times because of the risks involved.

Ivatan IK, classificatory systems, and risk reduction practices are impelled by the need to adapt to a disaster prone environment because of its geomorphology, location, and local practices. Adaptation involves precise interpretation of biological and physical signals to ensure survival based on tradition, experience, and new information (Bankoff, 2003; Hoffman and Oliver-Smith, 2003). They are as intertwined with tradition as they are always in flux (Abele, 1977; Briggs and Sharp, 2004; Brodt, 2001; Esteban, 2015; Hornedo, 2000). They remain relevant in the present (Anuradha, 1998; Chesterfield and Ruddle 19791; Esteban, 2015; Oliver-Smith, 1979; Tong, 2010) because of their openness to new knowledge and practices for survival.

STATEMENT OF AUTHORSHIP

RC Esteban conducted the literature review, provided the analytical framework, wrote the paper and submitted it for review, revised the paper based on the reviews, and submitted the revised paper for publication. EA Valientes provided the data based on his fieldwork in Batanes from 2011-2013 and 2017, and supplied information to fill in the gaps in the data throughout the entire process that the paper went through.

ENDNOTES

[1]I was in a group of faculty from the College of Social Sciences and Humanities of the Mindanao State University-Marawi that went to Bumbaran to explore the possibilities of extension work in the town in 1995. The visit to Bumbaran was under the auspices of Dean Amina Usodan-Sumagayan. Mayor Mastura Manabilang who hosted us in Frankfort, Bumbaran. The Ivatans attended the program in the evening of the second day that we were in the town (RC Esteban). Amai Manabilang, the new name of Bumbaran, is after the name of the grandfather of the mayor.

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