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Understanding the Environmental Roles of Mining Beliefs and Practices in Sitio Midas, Itogon

Manuelito O. Tabuzo

Irisan Learning Center, Irisan, Baguio City
Author email address: xanvier12@gmail.com

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Abstract

Mining beliefs and practices are among the most important considerations concerning environmental conservation, specifically for the Kankanaeys of Sitio Midas, Itogon, Benguet. These beliefs and practices have guided the community's mining activities and relationships, and informed residents' environmental stewardship, despite the unavoidable link between mining and environmental destruction and degradation of Kankanaey culture. This study explores the vital role of mining beliefs and practices in protecting the environment in a small-scale scale-mining community using a qualitative ethnographic research design with unstructured interviews and non-participatory observation as data collection methods. The findings revealed that modernization does not prevent miners from using their traditional skills, methods, and expertise, which are simple and practical, without causing significant environmental damage. The Kankanaeys' pro-environmental worldview influenced traditional mining norms and behaviors in Sitio Midas. Kankanaey miners' cultural and environmental concerns include a loss of spirituality, the decline of traditional culture, the influence of large commercial mining companies, and safety mining. Despite these challenges and concerns, traditional Kankanaey mining continues to play an important role in environmental sustainability and community resilience, providing new insight or initiatives to increase assistance and capabilities relevant to traditional culture in mining and environmental protection.

Introduction

Mining beliefs and practices have a fundamental role in the environmental conservation practice of Kankanaey in Sitio Midas, Itogon, Benguet. In this regard, an understanding of such a role is a valuable research endeavor. Long before the introduction of western and external forms of natural resources and management, the Kankanaey community had well developed a mechanism for resource management and environmental sustainability. Hence, understanding the mining beliefs and practices of the Kankanaey community in Sitio Midas is one of the most important features that should be discussed in the promotion of environmental conservation.

In the study of Addei and Amnkwan (2011), the authors assert that mining beliefs and practices can contribute to maintaining a sustainable environment, particularly in natural resource management. The author argues that strengthened mining beliefs and practices which are built upon cultural and spiritual values lead to minimized deforestation or pollution and greater benefit in protecting the environment. Likewise, Cobbinah (2015) and Malanes (2002) mentioned that the recognition of cultural mining beliefs and practices is imperative in overcoming environmental issues. Therefore, understanding the role of these beliefs and practices in environmental conservation is important in the contemporary pursuit of effective solutions to environmental challenges.

Itogon, Benguet, including Sitio Midas, is one of the oldest mining towns in the Philippines and one of the major contributors to the mining industry in the Philippines (Chaloping-March, 2006; Leung & Lu, 2022). Gold, copper, and silver are produced in this town which is home to Kankanaeys who are among the major ethnolinguistic groups from the Cordillera currently residing here. In Itogon, gold mining molded socio-economic activities, beliefs, and traditional practices. However, mining involves human intervention in the environment which is why mining in this town is considered a "key point" for environmental issues (Caballero, 1996; Malanes, 2002).

According to Caballero (1996) and Malanes (2002), gold mining among Kankanaeys has been spiritual and its pro-environmental worldview has enabled its role in environmental sustainability. The authors describe the miners' belief that deities or spirits protect and manage the land, forests, rivers, caves, and mountains. Traditionally, gold is considered a blessing from these deities or spirits, so the miners do not claim ownership. From such spiritual values of gold, the Kankanaeys created a complex spiritual practice, socio-cultural and economic subsystems, and manual methods. Earlier ethnographic accounts appreciated the Kankanaeys' expertise in the mining practices they have developed (Caballero, 1996; Canilao, 2011). For example, they have a sensitivity to good practices and prohibitions on mining and they have used simple tools and technology for extraction and processing; they have likewise, relied on manual labor without the use of toxic chemicals before the entry of western means in gold extraction (Canilao, 2011; Cariño, 2023). Further, these ethical practices and moral principles extend to their social structure by instilling a sense of a well-organized sociopolitical or justice system that has been passed down orally to future generations (Malanes, 2002). This social structure begins with a strong sense of communal welfare and non-materialistic attitudes and is maintained by the normative authority of elders, who carry on traditional belief systems passed down through generations. Therefore, moral principles, social structure, and ethical standards for mining among the Kankanaeys are all related to a worldview that values the interconnection between the human and spiritual realms expressed in the ethical extraction of gold as a means of care for the gifting environment.

These behavioral concepts on gold mining, local knowledge, and the Kankanaeys' worldview have resulted in a system infused with pro-environmental values, reinforcing resource stewardship and conservation at all levels. The underlying connection between Kankanaey culture and the value of gold to their society developed an important mechanism for pro-environmental behavior among Kankanaey miners (Caballero, 1996; Malanes, 2002). However, despite these cultural, normative appreciations, and value-based aspects of gold mining that can be improved and managed in their environment without external intervention, it is undeniable that attitudes, behaviors, and ways of life regarding gold mining have changed. Miners in Itogon are under pressure due to the conflicts between their cultural mining beliefs and the demands or attractions of contemporary standards of living.

Given the extractive nature of its operation, mining has an extreme effect on its surroundings and local communities; thus, modern mining activities are inextricably linked to environmental destruction (Baguilat, 2011; Leung & Lu, 2022; United Nations Environment Programme, 2020). The importance of local knowledge and worldviews in gold mining has been overlooked due to the influence of corporate interest and/or large mining companies (Habana, 2001; Malanes, 2002). Because they are driven by profit, adherents of modernized gold extraction techniques employ efficient but destructive methods such as the use of sulfide or cyanide, explosive equipment, migration, and open pit mining (Canilao, 2011; Habana, 2001).

These external means and interests had an impact on indigenous communities' strong cultural ties, resulting in the loss of local knowledge on mining, and varieties of Kankanaey culture and identity. A community's structural and cultural identity is linked to their ancestral lands and does not require cultural assimilation (Baguilat, 2011). According to this viewpoint, long-standing cultural conflict is linked to their authentic beliefs and practices, as well as their local land, known as ancestral lands. External influences in the form of corporate interests and unfavorable policies disadvantaged local communities who struggled with western priorities (Luetz & Nunn, 2023; Caballero, 1996; Malanes, 2002). With the predominance of western inclination to see natural resources as exploitable assets, the roles of indigenous wisdom that valued ecological balance were underappreciated. This study is not necessarily against external influences, but it argues that both external entities and Kankanaey miners should use the latter's unique way of life to address the problems of their immediate environment. Addressing environmental challenges is a call for the survival of and/or survival of local knowledge in mining that has been proven sustainable and pro-environmental (Malanes, 2002).

The situation on both cultural and environmental issues motivated the researcher to explore and understand mining beliefs and practices in Sitio Midas in Barangay Ucab, Itogon, Benguet. The study aimed to explore and understand the relevance of mining beliefs and practices in environmental discussions. The study was interested in mining beliefs and practices that related to environmental protection and was also concerned with how these have persisted or changed over time. The result of this study will serve as a baseline for further understanding of mining beliefs and practices and their roles in their environment. This study will also serve as a reference for other issues and concerns relating to life experiences in Sitio Midas Itogon, Benguet. Moreover, information from the study will contribute to policy recommendations and the body of knowledge and primary sources on cultural studies concerning the environment.

Methodology

The Values, Beliefs, and Norms (VBN) theory asserts that values influence pro-environmental behavior through pro-environmental beliefs and personal norms coming from a specific society's ecological worldview (Stern et al., 1999). It argues further that cultural norms and practices will emerge in certain communities based on the members' sense of moral responsibility and pro-environmental beliefs. This theory has been an effective explanatory framework for making sense of how mining and the environment are inextricably linked in mining beliefs and practices.

Traditional mining takes a more spiritual outlook on things, highlighted by the belief that unseen beings own the gold and that mining gold needs the intervention of spirits and deities (Addei & Amnkwah, 2011; Caballero, 1996; Malanes, 2002). Such high regard for spirituality in indigenous communities extends to pro-environmental behaviors in different mining practices. Caballero (1996) argues that the mining beliefs and practices of the Kankanaeys are more responsible when environmental care is concerned. The traditional process of gold mining is proven sustainable and environmentally friendly, in which they use organic materials and simple technology that involves manual labor without using any toxic chemicals such as mercury and cyanide (Canilao, 2011; Habana, 2001). Therefore, the existence of cultural norms and practices among Kankanaey miners is infused with pro-environmental values.

However, most mining beliefs and practices have been pushed to the background as a result of modernization and development. Mining has evolved as a result of the adoption of new technologies and processes, as well as the dismissal of traditional pro-environmental values because of the influence of external knowledge, and gold was defined economically rather than spiritually valued. Thus, Kankanaey miners in Sitio Midas face the current environmental and cultural challenges due to the loss of their attachment to spiritual views.

Research Design

This study employed a qualitative and ethnographic research design to explore and understand the roles of mining beliefs and

practices in environmental conservation in Sitio Midas. The study was conducted from September 2022 to April 2023. Ethnographic research is a qualitative method where the researcher observes and/or interacts with the study's participants in their real-life environment (Reeves et al., 2009) to fully understand a certain situation inside the community. Therefore, ethnography focuses on the "lived experience" in all its sensuous forms (van Hulst et al., 2015).

Figure 1 demonstrates how mining beliefs and practices are inextricably linked to environmental sustainability. These beliefs and practices were shaped by their ecological worldview. In Kankanaey's worldview, spirits and deities own the gold and mountains, and humans are called for resource stewardship and respect for the environment.

This worldview instills normative values through various mining beliefs and practices. These are the common guidelines and ethical basis for mining, which can sometimes include rules on how to extract gold. In Sitio Midas, miners followed common guidelines such as rituals, taboos, and cultural norms. Kankanaey miners' belief systems, norms, and behaviors encourage pro-environmental behavior; however, there are external causes of both cultural and environmental concerns that pose a threat to the survival of these beliefs and practices.

Study Site

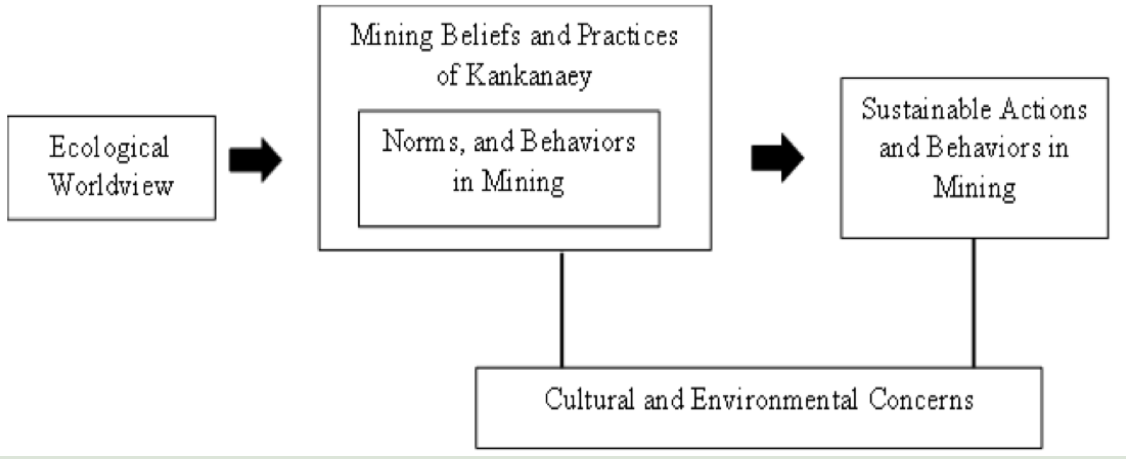
Sitio Midas, Itogon Benguet (from Figure 2) is the site of the oldest mining communities in Itogon. It is a part of barangay Ucab, Itogon, Benguet with a population of 8,751 (Philippine Statistics Authority [PSA], 2021) and situated at approximately 16.3901, 120.6610, in the island of Luzon. Elevation at these coordinates was estimated at 1,106.5 meters or 3,630.2 feet above mean sea level (PhilAtlas, 2020). The areas in Barangay Ucab are largely rugged, with land parts that are mountainous and plain. Most individuals in the different Sitios of Barangay Ucab are involved in a pocket or small-scale mining while others are businessmen, laborers, and/or farmers with 80% of the population in Itogon relying on small-scale mining (PlanetGold, 2020). Barangay Ucab is the home of two major Cordillera ethnolinguistic groups, Ibaloi and Kankanaey, while lowlanders (Ilocano and Tagalog) and other Cordillera ethnolinguistic groups, (Ifugao and Kalinga) are ranked as minor settlers in Barangay Ucab (Municipality of Itogon, 2023).

General Information of Participants

Eight participants in the study are members of the mining community in Sitio Midas. The study used non-random sampling based on the following judgment and criteria set for the study: must have cultural knowledge of their mining practices and beliefs and must be a miner and resident in Sitio Midas. The participants of

Figure 1

Paradigm of the Study



the study are all Kankanaeys, and most of them have been mining for over 20 years, with some of them starting as young as 16 years old. This means that these are veteran miners who are familiar with mining activities in their area. They are comprised of elders, miners, and other members of the mining community.

Data Gathering and Ethical Considerations

The unstructured interview was conducted among the participants. The unstructured interview was translated into their local language while allowing the participants to express their ideas about the study. Interview-guide questions covered questions on different mining beliefs and practices, their insights on the roles of their beliefs on environmental conservation practices, and cultural and environmental challenges in mining.

The general steps followed are: preliminary coordination with authorities and the mining community, gathering details on mining practices and beliefs, non-participatory observation and interviewing, and data collection from other primary and secondary sources.

In the preliminary coordination, the researcher coordinated with and obtained permission from the Barangay Captain, Purok leader, workers, and families from the mining community to conduct the study while securing ethical considerations for the study. A letter of approval with the signature of the Barangay Captain and Purok Leader was utilized to signify the approval of the visit to the community. This communication between the researcher and local leaders (Barangay Captain and Purok Leader) took one week to arrange. Through the help of a local leader, the communication between the researcher and the mining community was made and a schedule was set for visits between 9am-4pm (except Sundays). In the early phase of these visits, the community members were informed about the study. Every time the researcher visited, communication between the purok leader and other local officials was made to consistently inform them about the conduct of the study.

During the interview and observations, the researcher explained the purpose and significance of the study and entertained any questions the participants may have. The letter of approval was given to participants and mining sites and asked

Figure 2

Map of Sitio Midas, Itogon, Benguet (Source: Google Map © 2023)

if they were willing to participate. For securing the ethical considerations, consent for recording of interview and observation was also asked, and the anonymity of participants and confidentiality of their data and mining sites were assured. During the observation, the researcher followed different safety protocols mentioned by miners and local leaders to ensure safety while conducting the study.

Data were also gathered from secondary sources (books and electronic sources from the internet) related to practices and beliefs on mining and on environmental impact. Past ethnographic documents (academic journals, magazines, newspapers, and photos) related to the study were also consulted.

Data Analysis

The data gathered in the interviews and observation were analyzed through the use of thematic analysis. Specifically, the study followed a systematic procedure as follows: (1) Collected data were described, and organized; (2) significant details and categorized information were identified. Significant details described by the researcher included recurrent words and patterns of behavior on beliefs and practices in Midas about mining; (3) From categorizing and signifying important data, major themes were identified, analyzed and compared them with other major resources related to the study.

Results and Discussion

Sustainable Methods and Process for Gold Extractions

The majority of Kankanaey miners in Sitio Midas are independent of Itogon's major mining industry and are referred to as traditional or small-scale miners. The introduction of external influences in gold mining, such as modern technologies and large-scale mining operations, did not diminish the presence of traditional gold mining processes, skills, and methods in Sitio Midas. Even though tools have been improved to be more durable and/or iron-type with mechanized equipment, previous studies (Caballero, 1996; Canilao, 2011) acknowledged the simplicity of tools and other mechanical equipment, in contrast to large-scale mining methods.

Kankanaey miners typically use the following tools: *kunyas* or *makunyas* (iron chisels), *maso* (double-sided iron hammer with wooden handle for digging and crushing ores), *bareta* (iron crowbar), *pala* (shovel), *tali* (rope), *bagon* (cart with rubber wheel that serves as transportation of sack of ores carried outside the tunnel), a battery-operated mining helmet lamp, *beliwengweng* (a hand-held tool shaped like a big magnifying glass with a wooden handle and a rubber loop attached for holding the ore together while it is crushed), a sack used for containing waste ore (*mulok*), *naba* (gold bearing ore), and gold panner. Caballero (1996) describes similar tools used by Kankanaey miners, which were originally made of wood or lumber and evolved into refined iron-type tools for faster gold extraction. These tools were present, and they were supplemented by mechanized equipment such as ventilation blowers and ball mills (a rotating metal cylinder filled with metal steel rods designed to crush ore) powered by electricity or generators to rotate them.

Through the help of simple and mechanized tools, Kankanaey miners in Sitio Midas demonstrated sustainable methods through their skills, techniques, and expertise. Previous studies (Cabellero, 1996; Canilao, 2011; Habana, 2002) recognize these expertise and long-term skills and methods in gold mining that were developed prior to the Spanish occupation and are clearly the result of manual and hard labor, thus miners' expertise on gold has remained sustainable with minimal damage in the environment.

Kankanaey miners in Sitio Midas have three types of living conditions: (1) relatively stable and organized housing among the miners who are permanent residents of the community, which are sometimes made of concrete materials; and (2) temporary huts and houses made of lumber and a roof made of corrugated metal aluminum sheet, which are constructed either by permanent residents for their second home nearer the mine sites or by transient migrant miners, and (3) barracks for contractual and transient migrant workers. Mining activities oftentimes take place on weekdays (including Saturdays) beginning at 8am. Depending on the weather, workers could last until 5pm. A tunnel owner is

known as a supplier or financer who usually finances the necessary expenses, tools, and equipment, including food. According to observations, the average number of miners per tunnel is 3-4, with men making up the majority.

The most commonly used method in Sitio Midas is dog hole mining or lode mining (*agabukay*) which was employed before the Spanish colonization, which was a similar interpretation from previous studies (Canilao, 2011; Chaloping-March, 2006). This common type of gold mining entails several steps: (1) digging or tunneling; (2) crushing and milling large gold ores and grinding; (3) separation and retrieval of gold particles; and (4) smelting.

Tunneling involves digging a pathway or tunnel into the rock or earth where miners believe gold is located. These tunnels (*usok*) are approximately two meters in height and width and are supported by timber, or pillars that are placed on walls and roods of tunnels and were cut from nearby mountains. In cutting trees, permission from the spirits of the forest should be secured to ensure the safety of miners. Elders and miners also offered some prayers for the strength of these pillars. This practice is also described by Caballero (1996) who remarked on the strength and durability of these tunnel pillars. The researcher agrees that these pillars do not only show their strength but also the soundness of the miners' mining techniques and management of their mines. They observe a specific regulation to prevent collapse as they believe that the strength of these pillars is a sign of continuous gold production in the next generations. They sometimes interpret such favor as a *bendisyon iti Apo Dios* or blessing from their god or deity.

Digging was sometimes referred to as *abucay*. Miners found the gold by observing the quality and contours of the land. The most common method of digging is by hand, using the tools mentioned above. Miners chiseled at the gold-bearing ore (*naba*), separated it from the *mulok* (rock or soil containing gold particles), and periodically assessed the ore's gold content. The ore can be carried outside the tunnel, or usok using a *bagon*, to the ball mill. During the digging process, only a few women and children were allowed to enter the tunnel and were tasked with collecting gold ores outside.

The process of crushing and milling large ores involved washing, and crushing gold ores with *maso* and *baliwengweng*. The rubber loop of *baliwengweng* holds the gold ore and is crushed using *maso* and then grinding in a ball mill. In this stage, women and children were frequently involved in the process. The crushed ore was fed into the ball mill, along with water. Milling takes approximately two to four hours, depending on the size of the ore being crushed. During milling, no toxic chemicals or harmful tools were used; the ores appeared to be powder or sand. These are then put into a metal pan for panning and gold recovery.

In the separation and retrieval of gold, a sandy metal is made to pass through a series of wooden or cement chutes called *barkis*. *Barkis* are lined with jute sacks called *ap-ap*. Gold particles stick to the *ap-ap*, and water continuously washes the ore down the chutes. Any gold particles (powdered materials) are washed from the jute sacks collected in a large tub and then placed in a round metal pan for the gold recovery process. The gold particles are concentrated in the center of the metal pan as they move in a circular motion. The process is repeated until most of the gold particles are recovered.

In the smelting process, gold grains were wrapped in plastic and heated to a high temperature. After the gold grains were heated, they were soaked in water for purification, yielding a gold nugget that was weighed on a balance scale and sold to a local dealer.

Kankanaey miners' work conditions and expertise are described as simple and physically labor-intensive methods derived from traditional mining methods. Traditional methods of mining in Sitio Midas use almost no chemicals and have little environmental impact. This expertise and knowledge are shaped by its resource management techniques, which range from natural gold recovery methods to the recycling process. The study observed the use of sunflower leaves (*marapait)*, vegetable pears (*sayote*), magnets, and calamansi for gold recovery and separation. The juice from *marapait* or *sayote* is squeezed to prevent fine gold from floating during panning, and a magnet is used to separate gold grains from other substances.

This study was similar to Caballero's (1996)

in that it recognized their recycling methods and resource management techniques in the absence of chemicals. However, the study highlights how gold mining in Sitio Midas evolved through the use of both traditional and modern methods. On other mining sites, miners continue to use traditional methods while adopting alternative methods such as cyanide and mercury during the recovery and smelting processes, while others have adopted the carbon-in-pulp (CIP) process, modern technology being introduced by large-scale miners (Cariño, 2023; Chaloping-March, 2006). Moreover, dynamite, or *bongbong* was also used during the tunneling process. Because of the potential dangers to the mountains, sanitation, water quality in the area, and/or miners' health, various local communities in Sitio Midas and the local government implement an intervention program for occupational health and safety measures for miners to minimize or avoid the use of these dangerous methods (Inquirer.net, 2019; Leung & Lu, 2022; Municipality of Itogon, 2023).

Throughout generations, the Kankanaeys in Sitio Midas who mined gold developed expertise and skills in extracting gold from ore. These mining technologies, skills, and methods were developed following their traditional knowledge and wisdom regarding environmental stewardship. Thus, these exist some sustainable Kankanaey methods and processes that are simple, practical, low-impact, and do not involve the use of toxic chemicals or destructive methods. This contrasts with the methods of large mining companies, which have degraded the land and environment, as well as other miners influenced by these modernized methods (Habana, 2001).

Pro-Environment Culture System and Practices on Mining

Spirituality of Kankanaey Culture

Sustainable mining has not always been associated with the use of tools, methods, and techniques. It also involves the Kankanaeys' cultural system, which ranges from their environmental worldview to their social subsystem. According to the Values, Beliefs, and Norms (VBN) theory, a pro-environmental worldview influences sustainable practices in the form of the value of resources, common norms, and behavior (Stern et al., 1999). This study argues that Kankanaey's cultural systems and practices encompass environmental protection, preservation, and management shaped by a spiritual ecological worldview instilled in miners.

Kankanaey spirituality provides an innate connection to nature, or a strong attachment to deities and spirits, which is generally conducive to environmentally friendly mining practices. The Kankanaeys were described as highly spiritual and remained so (Doctolero, 2021; Malanes, 2002). They believe that deities and spirits protected and managed the land, forests, rivers, caves, and mountains. Some deities' and spirits' names were mentioned in rituals, prayers, and folklore, as seen in prayers like *O, Apo Kubunian*... (O, our God) or *Kabunian ed daya dawatek ngarud ken sik-a* (Kabunian who is in heaven, I pray to you). They believe in and worship Kabunian, a supreme being, and other spirits known as *Tumugaw/Tumongaws*. The Kankanaeys' central ecological worldview is based on their beliefs in deities and spirituality, as deities and spirits are regarded as the ultimate owners of gold, mountains, and other natural resources. Similar studies (Caballero, 1996; Malanes, 2002) show that Kankanaey's spiritual beliefs have a significant impact on their lives, particularly in mining and community sustainability. Kankanaey miners believe that their level of submission to deities and spirits determines the returns they receive from gold mining and production in their community; thus, they should protect deities' domains and resources while maintaining a positive relationship with "owners" and the community.

The study also emphasizes rituals as an important part of Kankanaey's religious practice including prayers, dances, and offerings. Rituals in mining are occasionally performed to celebrate and ward off illness, as well as to regain or remember the grace of deities or spirits. Others are performed to appease the spirits or deities when taboos are broken or as a prelude to asking for good results from unseen beings in mining activities (Caballero, 1996). Most rites involve *manbunongs,* or chief priests, leading common prayers and rituals in mining. Kankanaey rituals, including mining rituals, were numerous, as Doctolero (2021) describes in its "megalithic culture complex," but the communal functions and purpose were the same.

Some of the rituals mentioned by the community were *begnas* (a ritual during times of extreme hardship and to remove misfortunes), *pakde* (a ritual performed to appease the unseen and the Supreme Being), and *sangbo*. As Participant 1 said in Ilocano, *dayta sangbo ritual para iti gasat iti panagminas wenno panagyaman iti apo* (*Sangbo* is a ritual for luck in mining or thanksgiving to God). This ritual is performed through songs, prayers, animal sacrifices (pigs and chickens), and community dance. As the study narrates, *Sangbo* oftentimes starts and ends with prayer and a song. This ritual is typically led by the host (families or community in charge of gatherings), the elders, or *manbunongs*, through a prayer while other members are preparing for the meal. Two pigs and two chickens were killed, cooked, offered tapuy (rice wine), and closed in prayer, which takes 4-6 minutes. Soon after, visitors were given ritual pigs, chickens, and other foods, followed by a community dance played with *gangsa* (gongs) and *solibao* (drum).

Kankanaey rituals in mining are an important aspect of religious practice that serves as a means of communication with deities and spirits as owners of their domain, as well as a sense of strong community connection among members through spiritual exercise (Doctolero, 2021; Sacla, 1987). This complex belief system is one of the most important aspects describing their high reliance on nature and spirituality. They believe that the essence of spiritual communication or exercise provides wisdom of guidelines and duties to protect their domain from harm. This spiritual exercise of the Kankanaeys evolved into a system of traditional knowledge infused with pro-environmental views, which is passed down from generation to generation through resource stewardship and conservation at all levels.

Taboos on Mining

The Kankanaeys' traditional ecological worldview can be observed both behind and beyond taboos. It is also interesting to note that visitors should follow guidelines when participating due to their beliefs about mining taboos. The Kankanaeys were very attached to omens and taboos, as evidenced by Moss' (1920) ethnographic study on Southern Kankanaey and Caballero's (1996) study on Itogon. Similarly, there were numerous mining taboos, as participants 6 and 7 stated in Ilocano: *No aramidem ti maiparit, aglemmeng wenno agpukaw ti balitok,* (When you do what is forbidden, the gold will hide or disappear). These were the general reactions of miners, who believed that deities or spirits who owned the gold would conceal it. Furthermore, there are common consequences to breaking taboos, such as misfortune in the miners' families and communities, illness, and natural disasters. These ties to taboos extend to how they acknowledge the superior control of deities and spirits in their natural environment and lives. The complex beliefs about taboos serve as a regulatory behavior to ensure relationships with deities or spirits and the environment to maintain a steady supply of gold, other livelihood activities, wealth, and a long, healthy life.

Some mining taboos include the prohibition of eating certain types of food (dogs or fish) before entering the mine, as these are thought to have an offensive odor. These types of odors "compete" with the smell of gold, making it difficult for miners to focus on the "smell" of gold. When miners eat the prohibited meat, they should stop mining for at least 5 days; otherwise, they will have bad luck. Furthermore, miners are not permitted to mine or enter the mines, when they are newly-wed, when they have sexual intercourse, when there is a death in the family, or when there is death in the community. Inside the tunnel, neither miners nor visitors were permitted to sing, whistle, shout, cry, or play music. During the processing of gold ore in the milling area, miners stated that women were not permitted to laugh or converse (*tsismisan*), and this prohibition is similar to the notes of previous studies (Banes, 2019; Caballero, 1996; Chaloping-March, 2006).

Values and ethics, or a sense of right and wrong, emerge from a Kankanaey worldview, as do the proper methods of mining. This mining culture instills values, which are viewed as a means of achieving environmental sustainability. Taboos have a unique connection to nature and spirituality, which extends to resource stewardship to honor, appease, and seek favor from spirits and deities. However, the combination of western knowledge and evident experiences continued to challenge these normative beliefs about whether consequences happened or were proven to be true today (Banes, 2019).

Socio-cultural Subsystems and Communal Behaviors

The social organization and relationship in Sitio Midas were described as having visible communal characteristics. The social structure and authority were based on land ownership and community member seniority, as described by Caballero (1996) and Habana (2001). Elders of the community were called *lakay* (elder) or *panglakayan* (group of elders), both male terms of reference, whose authorities were derived from accumulated wealth or knowledge of oral tradition with the approval of the community or previous elders with the preference of senior line. Traditionally, elders own and manage their primary resources, such as tunnels and gold, as well as other resources and properties (pigs, water resources, and farms). On elders' authority, they become consultants to resolve any conflict, known as the tungtung system, act as judicial bodies, and frequently grant community members the authority to own mine tunnels (Caballero, 1996; Malanes, 2002). Elders also ensure that norms and traditions are followed during mining activities, particularly gold sharing and rituals. However, as a result of social changes in contemporary society, the emphasis on elders' traditional authority is being challenged by their traditional land ownership and roles in society. Cariño (2023) and Habana (2001) were also concerned with the normative value of authority, citing the significant influence of both corporate interests and laws. Despite the changes, the study found that some elders are still alive and serving as leaders in their communities.

The traditional authority of leadership and the authority of elders play an important role in preserving traditional culture and environmental sustainability as they play a multifaceted role in ensuring environmental sustainability. It is because they have a thorough understanding of their environment and sustainable resource management practices. Elders become cultural and environmental stewards by focusing on both cultural identity and environmental sustainability. They provide a practical demonstration of sustainable practices for younger generations and serve as guardians to ensure that miners in Sitio Midas reinforce various pro-environmental worldviews and behaviors related to gold mining, which should provide the community with an overall responsibility to balance their relationship with the community, spirits, deities, and community.

Sumeg-ang's (2005) ethnography of Kankanaey culture identifies communal unity and social cohesion as two of the most important aspects of their normative tradition. Music, dances, social gatherings, and spiritual practices all help to foster member solidarity by reinforcing cooperation and coordination. These serve as a foundation for social interaction and foster shared values within the Kankanaey community, potentially preserving their traditional identity. This communal behavior may be motivated by a strong sense of spiritual and social interconnectedness. Beyond this, the study emphasizes the importance of sustainable practices and expands mining practices in Sitio Midas.

Gold for miners has value for communal behaviors in Sitio Midas, where gold is described as communal property that must be shared with the rest of the community, not just elders or tunnel owners. The most common methods of sharing are the *sagaok* practices, which involve going from one tunnel to another and requesting ore with gold (Banes, 2019; Caballero, 1996; Malanes, 2002). According to participant responses, *sagaok* could also refer to the process of assisting other miners by transporting sacks of gold ore to the milling area or sharing them with the community when someone hits a mining jackpot, which can be translated into English as "sharing your blessings". According to Caballero's (1996) *sagaok* narratives, ore is traditionally given to the elders first, followed by other miners or the entire community, and the shared gold is used to perform a ritual. Miners frequently assist with mining by loading sacks into carts or transporting them outside the tunnels (Banes, 2019). The study also observed this practice; however, other traditional accounts of *sagaok* diverged significantly from the study's findings. The practice is most commonly observed within a family group rather than the entire community, and gold ore was not automatically given to elders or shared with the entire community, and rituals were rarely performed. From the perspective of the participants, *sagaok* practice continued, but other miners learned the economic value of gold rather than communal ownership or value. This study demonstrates that, despite current changes in sharing practices, *sagaok* continues to reflect Kankanaey miners' strong sense of

communal behavior and the importance of good relationships with their neighbors. Kankanaey miners have a distinct social mechanism due to their organization and play an important role in environmental sustainability. The sharing culture reinforces the concepts of recycling, processing of other materials, and resource efficiency, as well as limiting the number of miners inside the tunnel, preventing the overexploitation of gold by concentrating on a few tunnels waiting for the share. The community-centered approach of communities in Sitio Midas fosters a sense of collective responsibility, which may be critical for community-driven conservation efforts. This communal behavior was also spiritually sensitive to Kankanaeys' spiritual worldview, as it was deeply rooted but driven to maintain a harmonious relationship with nature and community (Luetz & Nunn, 2023). As a result, they respect all life forms not only nature but also other people by ensuring the well-being of the community and the environment, which they believe is a part of deities' and spirits' grace.

Concerns and Challenges

Cultural Concerns and Challenges

Miners and the mining community in Sitio Midas have made significant efforts to preserve traditional mining expertise and culture. The introduction of western and modern wisdom throughout history caused a shift in traditional societies' perceptions of nature, living, and socio-economic structures (Luetz & Nunn, 2023); thus, miners and/or the mining community in Sitio Midas faced some challenges, particularly in terms of preserving their traditional culture.

The practice and beliefs on gold mining in Sitio Midas have declined as a result of the lesser number of elders and the erosion of traditional values. Some mining taboos are being broken, and rituals are not being observed; as one participant stated, *napatpateg kadatayo ita ti kuarta* (money is more important to us now). This response describes how materialistic tendencies undermine traditional cultures. Commercialization in Itogon during the early 19th century led to the loss of traditional knowledge, and ownership, and changes in the socio-economic views of miners (Cariño, 2023; Habana, 2001). Traditionally, Kankanaey culture dictated that "gold is to be taken only when needed" (Malanes, 2002, p. 8), so mining activities are not full-time. However, with the entry of large mining companies, commercialization, and other external knowledge, miners and local communities shifted dramatically, becoming more economically motivated than spiritually driven.

Furthermore, the introduction of materialistic influence encourages miners to engage in an individualistic rather than communal attitude (Luetz & Nunn, 2023). Participants admitted that *sagaok* is sometimes ignored. After all, they believe they are not obliged to help and share because they need money; as a result, some community members see gold mining as more of an economic activity than a cultural value. There have also been some cases of theft in tunnels, and men have learned to gamble, which motivates them to earn money rather than share ore samples with their family or community.

The decline in the number of elders in Sitio Midas is also cause for concern, as many older members have died, resulting in the loss of traditional knowledge. Only 3.76% of the Midas population is of the age of 65 or above; thus, there is a lesser source of knowledge on traditional beliefs and practices (Municipality of Itogon, 2023). Despite this concern, older generations still valued the presence of elders and adhered to oral laws. Both older generations and elders attempted to preserve their culture by teaching younger generations amid modernization; however, there are some generational conflicts because younger generations may prioritize modern knowledge and earning money over preserving traditional cultural practices in mining.

Modernity challenged traditional values in Sitio Midas, which held pro-environmental behaviors of miners. Traditional culture in the community is ineffective at preserving and maintaining social harmony and nature unless it is followed and valued (Luetz & Nunn, 2023). For example, taboos were effective in regulating gold overexploitation, but tunnels were deeper due to numbers and profit motives. External values or material motivation, as well as the contest on normative authority, present a challenge that can sometimes draw a conflict with environmental and ecological protection.

Environmental Concerns and Challenges

The spirituality of Kankanaey miners in Sitio Midas is validated by their environmental behaviors in mining; however, concerns and challenges extended to a huge for small-scale miners. They also faced issues on their status as an "Indigenous Community," and other concerns with formal sectors dealing with environmental issues.

Over the last decade, large mining operations in Itogon have faced cultural and environmental challenges (Habana, 2001). Participants in the study addressed these concerns as well, with many believing that they had made a significant difference in their social landscape from their physical environment. Traditional methods of mining adopted some alternative yet harmful methods of gold mining, such as cyanide, mercury, and the use of dynamite, which began in the 1970s and 1980s as traditional small-scale miners owned mechanized ball millers and cyanide leaching pads (Caballero, 1996; Mines and Geosciences Bureau [MGB], 2016).

Chemical use has implications for both health and the environment. According to Leung and Lu's (2016) study, these chemicals, such as cyanide, have become an occupational safety, health, and environmental concern for miners, with the majority of small-scale miners suffering from cyanide-related adverse effects such as chronic cough, chest pain, and progressive breathlessness. Additionally, from profile data made by the Municipal Government of Itogon (2023), coughs and colds are the most common reasons for residents to visit the barangay health station due to some effects of chemicals. Moreover, cyanide and other chemicals pose an environmental risk due to improper waste disposal, which can result in poisoning and pollution. There are some cases of dumping chemical waste and rivers and open dumping contributing to 27.31% as one of the top disposal methods in Barangay Ucab (Municipality of Itogon, 2023). The study narrative includes some instances of improper waste disposal of chemicals, such as the use of cyanide during the recovery process while miners were not wearing any protective equipment most especially inside the tunnels that may cause respiratory illness due to air quality and temperature inside.

Gold mining also caused conflict, affecting livelihoods, the environment, and indigenous ancestral domains, due to gaps and/or conflict of benefits in cultural and natural resource protection. These include ongoing conflicts between traditional small-scale miners, large-scale mining companies, and indigenous communities caused by the current national mining policy. For example, the Philippine Mining Act of 1995 invites more companies and migrant and/or contractual workers from lowland areas, with the potential for disastrous effects not only on the environment but also on indigenous peoples' ancestral domains (Wetzlmaier, 2012), causing damage to their cultural identity because of overflow of workers. Previous studies and authors (Baguilat, 2011; Cariño, 2023 Wetzlmaier, 2012) also emphasized the gaps and conflict of interest in laws such as Indigenous Peoples' Right Act of 1997 (R.A. 8371), Philippine Mining Act of 1995 (R.A. 7942), and Peoples Small-Scale Mining Act of 1991 (R.A. 7076). These gaps and conflicts indicate the state's interest for economic development for the country but without concern for Indigenous Peoples' welfare. Many of the participants also discussed the long-standing conflict, with many believing that open pit mining and large commercial mining were to blame for the recent 2018 landslide in Barangay Ucab during Typhoon Ompong, which killed at least 91 people (GMA News, 2018).

The recent landslide sparked concerns and a large conflict among small-scale miners, as RA 7076 (People Small-Scale Mining Act of 1991) and other recent Department of Environment and Natural Resources (DENR) policies that regulate small-scale mining in Sitio Midas, with some policies requiring registration as a *Minahang Bayan* (Mining Cooperative) to comply with environmental protection policies and hazard procedures, as one participant mentioned, *Dakkel nga isyu dayta, ngem saan a datayo ti makagapu iti panagreggaay ti daga, dagiti dadakkel a kompania ti akinrebbeng iti dayta, saan a datayo ti mangdaddadael iti nakaparsuaan, isuda, sursurotentayo ti tradision* (that is a big issue, but we are not the cause of the landslide, the big companies are responsible for that, we are not the ones destroying the nature, they are, we are following the tradition). Because other small-scale mining areas have closed, many miners have become farmers, contract workers for large-scale companies, or workers outside of Itogon (Chaloping, 2006; Habana, 2001; Wetzlmaier,

2012). The entry of large-scale companies causes significant changes in their society because they privatize and monopolize some mining areas, making landowning conflicts a long-term issue.

In any case, the loss of cultural value and commercial interest has the potential for a negative impact on both culture and the environment. In some cases, the state fails to meet its obligations to respect, protect, and fulfill the rights of Indigenous Peoples (Wetzlmaier, 2012). However, many study participants continued to believe in the government's efforts and the importance of traditional culture in environmental sustainability. The study demonstrates that the Kankanaeys have survived for centuries as small-scale gold miners, despite concerns. The community is still advocating for cultural revitalization and environmental protection.

Conclusions

Traditional Kankanaey mining in Sitio Midas is driven not only by profit but also by consideration of environmental care and respect for unseen but powerful spirits; thus, the ecological worldview of the Kankanaey culture is ascertained to be pro-environment. Spiritual beliefs provide guides for miners to conduct their mining activities. These beliefs create a common standard for gold mining in a way that maintains proper relationships and communication with the protectors of the environment through rituals, observance of taboos, respecting the authority of elders, and obedience to customary laws. These beliefs became a common source of their principle or ethical values for the "right way of mining" and "proper utilization of gold mining." The "right way of mining" and their management of gold mining are characterized by the local community's attitude toward gold mining. This attitude as well as their views on protecting the environment are proven to be sustainable. These ethical guides may be understood as regulatory because they limit gold exploitation and emphasize traditional norms for resource stewardship. As a result, environmental destruction was minimized and this result makes the Kankanaey mining practices a model of sustainable resource management.

Small-scale mining in Sitio Midas is under threat of over-mining and environmental destruction because of the collapse of traditional spirituality. This happened mainly because of modern wisdom and economic demands for living, making traditional spirituality less significant today. Consequently, miners are now giving more premium to the gold and money earned without regard for environmental conditions. Degradation of values, in general, was associated with attachment to commercialization and materialistic rather than spiritual values.

Despite their protentional for environmental sustainability, Kankanaey mining beliefs and practices continue to loosen or are abandoned due to changed priorities. Though their vestiges are still expressed in prayers and rituals, the overall value system they used to represent may have declined. But despite being marginalized by large-scale commercial mines over time, these traditions have continued to present and survive. Both informal and formal sectors should design or come up with an implementing program to a new realization on initiative, and assistance that is relevant to the culture of Kankanaey miners and community to save the traditional culture from further degradation and environment destruction.

Recommendations

If the Kankanaey community's traditional culture in Sitio Midas collapses and there are serious cases of environmental degradation, local or national governments, through campaigns like the Mines and Geosciences Bureau's #MINERESPONSIBLITY campaign in 2019, should provide an assessment of the success of traditional culture on environmental sustainability through examination of traditional practices and institutions. This assessment could begin with how far traditional practices should be resurrected and revitalized. Traditional institutions and/or Indigenous groups' interests should be considered while ensuring sustainable economic growth as well as protecting the environment. While mandating environmental protection and economic development, both formal and informal sectors should close some gaps in Mining Laws and the Indigenous Peoples Rights Act (IPRA).

This socio-cultural development will be impossible to achieve without community involvement. As a result, some environmental campaigns can be shared and held accountable by

state agencies such as DENR, MGB, NCIP, mining firms, and traditional institutions, which should also include some intervention programs for miners' occupational health and safety, as well as livelihood programs.

Reviving and revitalizing the Kankanaeys' traditional culture can begin by strengthening education and incorporating the importance of traditional knowledge in various local schools throughout the Cordillera, with the assistance of educational departments and higher institutions that promote research and development on intellectual property. Meanwhile, DENR, TESDA, and DOLE could offer training and manpower development programs to assist other workers. Thus, both formal and informal efforts may be critical for responsible mining, socio-cultural or economic development, and environmental sustainability.

References

Addei, C., & Amnkwan, R.K. (2011). Myths and Superstition in the Small-scale gold mining industry of Ghana. *Research Journal of Environmental and Earth Sciences,* 3(3): 249-253.

Baguilat, B. (2011). Philippines: Mining And Its Impacts To Indigenous Communities. http:// indigenouspeoplesissues. com/index. Php

Banes, G.G. (2019). Women's Roles, Challenges, and Opportunities in Small-Scale Mining. *Mountain Journal of Science and Interdisciplinary Research (formerly Benguet State University Research Journal)*, 79(2 Supp 1): 49-60.

Caballero, E.J. (1996). *Gold from the Gods: Traditional Small-Scale Miners in the Philippines*. Quezon City: Giraffe books.

Canilao, M.A.P. (2011). Transformations in Ibaloi gold extraction: From the protohistoric period to the current era (14th c–20th c). *Aghamtao Journal,* 20, 20-39.

Cariño, J.K. (2023). Philippines: gold mining and Indigenous Peoples in the Cordillera - IWGIA - International Work Group for Indigenous Affairs. *IWGIA - International Work Group for Indigenous Affairs.* https://www.iwgia.org/en/philippines/5255-philippines-gold-mining-and-indigenous-peoples-in-the-cordillera.html#:~:text=In%202018%2C%20the%20Department%20of,their%20families%20in%20Ucab%2C%20Itogon.

Chaloping-March, M. (2006). The Place of Women in Mining in the Cordillera Region, Philippines. Women Miners in Developing Countries: Pit Women and Others. P. 185-208

Cobbinah, P.B. (2015). Local attitudes towards natural resources management in rural Ghana. *Management of Environmental Quality: An International Journal,* 26(3): 423-436.

Doctolero, J. (2021). Indigenous Healing Ritual in the Context of Ecological Disaster. *MST Review,* 23(1), 1-1.

GMA News. (2018). Death toll in Itogon landslide reaches 91. *GMA News Online*. https://www.gmanetwork.com/news/topstories/regions/669806/death-toll-in-itogon-landslide-reaches-91/story/

Habana, O.M. (2001). Gold Mining in Benguet: 1900-1941. *Philippine Studies* 49(1): 3–41.

Inquirer.Net. (2019). Cyanide barred in small-scale mine in Itogon. *Inquirer News*. https://newsinfo.inquirer.net/1074410/cyanide-barred-in-small-scale-mine-in-itogon

Leung, A.M.R., & Lu, J.L. (2016). Environmental Health and Safety Hazards among Indigenous Small-Scale Gold Miners Using Cyanidation in the Philippines. *Environmental Health Insights,* 10, 125–131. 10.4137/EHI.S38459

Leung, A.M.R., & Lu, J.L. (2022). Work Process and Hazard Analysis in Small-scale Gold Mining in Northern Philippines. *Acta Medica Philippina*, 56(1). https://doi.org/10.47895/amp.v56i1.3871

Luetz, J.M., & Nunn, P.D. (2023). Spirituality and sustainable development: An entangled and neglected relationship. *Sustainability Science*, 18(4): 2035-2042.

Malanes, M. (2002). Power from the mountains: Indigenous knowledge systems and practices in ancestral domain management: the experience of the Kankanaey-Bago people in Bakun, Benguet Province, Philippines. ILO.

Mines and Geosciences Bureau. (2016). Mining Industry Statistics. http://www.mgb.gov.ph/Files/Statistics/MineralIndustryStatistics.pdf.

Moss, C.R. (1920). *Kankanaey ceremonies* (Vol. 15). Berkeley: University of California Press.

Municipality of Itogon. (2023). *Barangay Profiles 2019-Itogon*. https://itogon.gov.ph/wp-content/uploads/2023/06/Ucab.pdf

PhilAtlas. (2020). https://www.philatlas.com/luzon/car/benguet/itogon/ucab.html

Philippine Statistics Authority. (2020). "Cordillera Administrative Region (CAR)". Total Population by Province, City, Municipality and Barangay. https://rssocar.psa.gov.ph/content/highlights-2020-population-cordillera-administrative-region-car#:~:text=Among%20the%20six%20provinces%20comprising,124%2C366%20persons%20(Figure%202).

PlanetGOLD. (2020). The resiliency of the Philippine Small-Scale Mining communities. https://www.planetgold.org/resiliency-philippine-small-scale-mining-communities

Reeves, S., Kuper, A., & Hodges, B.D. (2008). Qualitative research methodologies: Ethnography. *BMJ,* 337.

Sacla, W.D. (1987). *Treasury of Beliefs and Home Rituals of Benguet*. Philippines: BCF Printing Press.

Stern, P.C., Dietz, T., Abel, T., Guagnano, G.A., & Kalof, L. (1999). A value-belief-norm theory of support for social movements: The case of environmentalism. *Human ecology review*, 81-97.

Sumeg-ang, A. (2005). *"The Southern Kankana-eys". Ethnography of the Major Ethnolinguistic Groups in the Cordillera*. Quezon City: New Day Publishers. pp. 156–175.

United Nations Environment Programme. (2020). Sustainability Reporting in the Mining Sector: Current Status and Future Trends - Summary. https://wedocs.unep.org/20.500.11822/34051.

van Hulst, M., Koster, M., & Vermeulen, J. (2015). Ethnographic research. *Encyclopedia of Public Administration and Public Policy, 2*. 10.1081/E-EPAP3-120051222

Wetzlmaier, M. (2012). Cultural Impacts of Mining in Indigenous Peoples' Ancestral Domains in the Philippines. *ASEAS - Austrian Journal of South-East Asian Studies,* 5(2): 335-344.