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The Sustainability of the Charcoal-Making Tradition of the Aeta in the Municipality of Capas, Tarlac, Philippines

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Abstract. Capas is a first-class municipality in the Province of Tarlac, Philippines. The town was a part of vast wilderness inhabited by the ethnolinguistic group known as Aetas that occupying the mountain ranges of Central Luzon. The ethnic group continue to practice the traditional cutting and burning of trees to produce "uling" (charcoal) called kaingin which the Philippine laws forbid and termed as illegal farming practices which causes soil erosion, loss of soil fertility, and landslide. Aware of its illegality, they do not have any alternative way of farming. The study will share one of the methods of the Aetas regarding clearing land by burning grass and trees known as kaingin as part of their cultural practices despite the fact that such act violates the environmental laws of the land. Mixed methods research was applied to achieved a comprehensive result. Results showed that kaingin is a part of Aeta culture and it is a source of their social and economic stability and therefore, cultural preservation. Thus, it proposes an alternative upland farming for environmental and economic sustainability. In addition, this research situates indigenous charcoal production within contemporary sustainability discourse, emphasizing governance, cultural rights, and adaptive livelihoods. Ethnographic evidence demonstrates that Aeta resource-use decisions are guided by customary norms, seasonal constraints, and collective stewardship. The findings indicate a persistent policy gap between statutory environmental regulation and indigenous practice, underscoring the need for participatory, context-specific interventions. The study therefore recommends integrative policy frameworks recognizing indigenous ecological knowledge, livelihood security, and co-management approaches as essential components of upland development planning in the Philippines context.

Introduction

The Municipality of Capas is one of 17 municipalities in the Province of Tarlac in Region III of the Republic of the Philippines (Official Website of Municipality of Capas, Province of Tarlac 2020). It was created on September 10, 1710, by the Augustinian friars. It has a total land area of 377.60 square kilometers. The Municipality of Capas is politically divided into 20 barangays. Demographically, the 2020 Census of Population and Housing (CPH) of the Philippine Statistics Authority reports that the Municipality of Capas had a total population of 156,056. Politically, it is under the administration of Mayor Roseller B. Rodriguez, who assumed office on July 1, 2022, together with the elected Vice Mayor Alexander C. Espinosa and eight Municipal Council Members. Geographically, Capas is at a relatively high altitude, and the hilly areas near the mountains are about 46 meters above sea level. It is bordered by San Jose, Tarlac, to the north, Tarlac City to the northeast, Concepcion, Tarlac, to the east, Botolan, Zambales to the west and southwest, and Bamban, Tarlac, to the south.

Historically, Capas's first settlers were known as the Aetas. The Aetas have been given various names according to their historical, geographical, and social circumstances and their relationships with their neighbors. They are believed to be the first settlers of the inhabitants of the Philippines. The word *aeta* means *people*, but some believe it came from the Malay word *hitam* (black) or its Filipino cognate *itim* (black). Early ethnographic accounts of the Aeta, also known as Ayta, Alta, Atta, Ita, and Ati, call them *Negritos* (little blacks), mainly due to their skin color (CCP Encyclopedia of Philippine Art | CCP

Encylopedia of Philippine Art, n.d.). In addition to dark skin, the Aetas are also short, averaging 1.35 to 1.5 meters in height, with curly hair, an upturned nose, and big black eyes. Tindowen (2016) asserts that numerous studies have demonstrated the Aeta people's continued adherence to a nomadic lifestyle, wherein they rely on natural resources as the primary means of traditional economic activity and sustenance. This reliance encompasses traditional methods such as hunting, fishing, and foraging. These tribal people place limited emphasis on formal education, prioritizing necessities over scholastic pursuits (Ocampo and Ocampo 2014, Fig 1).

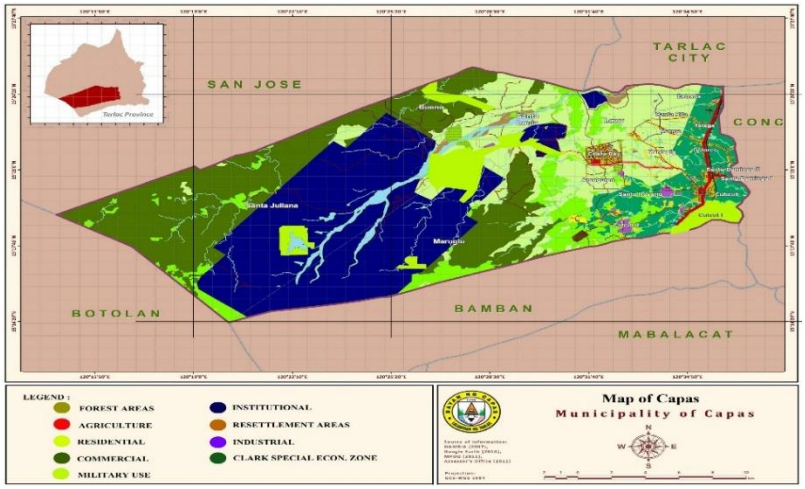

Figure 1: Map of Capas, Tarlac

Among the 20 barangays of Capas, Tarlac, the Aetas dwell as indigenous people in Barangay Aranguren, Barangay Bueno, Barangay Cut-Cut, Barangay Maruglo, Barangay Patling, and Barangay Sta. Juliana. These barangays are mountainous and hilly, filled with vast lands and forests; presumably, they are the places the Aeta first inhabited. The Aetas of Capas, Tarlac are one of the 110 indigenous cultural communities/indigenous peoples in the Philippines protected by the National Commission on Indigenous Peoples (NCIP). The NCIP was established "to protect and promote the interest and well-being of the indigenous cultural communities/indigenous peoples with due regard to their beliefs, customs, traditions, and institutions" (Mandate, Vision and Mission | National Commission on Indigenous Peoples, n.d.).

The Aetas in Capas, Tarlac, were traditional mangarbun (charcoal maker/s) who have been sustainably producing uling (charcoal) from generation to generation but continued to be blamed as criminal agriculturists for causing massive deforestation and ecological disasters. Such imagery is powerful and damaging, identifying their uling tradition as a primitive and unproductive waste of valuable forest resources. These imageries about the Aetas long tradition have been the subject of inconsiderate and unfair journalism in some indigenous communities like Palawan, Philippines (Anda 2015; Mercado 2015). The richness of the uling tradition has to be re-evaluated, and specific methods should be developed.

This study focused on group discussions, key informant interviews, and observation for data collection. The Aeta chieftains (elders) and charcoal-makers were the focal persons for group discussions. Unstructured discussions were conducted with the Aeta chieftains and expert charcoal makers to address the history, cultural meaning, economic stability, and sense of stewardship in their charcoal-making tradition. The researcher also rendered courtesy visits and interviews with the offices of the Municipal Office on Indigenous Communities and Community Environment and Natural Resources (CENRO) on the various activities and programs of both offices for the socio-cultural and economic sustainability of the Aetas of Capas, Tarlac. Upon completion of the study, the researcher also recommended an upland farming alternative and approaches that offer sustainable production, environmental benefits, and a new perspective to the Aeta people.

Methodology

Research Design

Ethnographic research methods were used in the study through observation, group discussions, one-on-one interviews, and time spent with or living among the Aeta participants to obtain a comprehensive and holistic result (Sangasubana 2014; Sharma and Sarkar 2019). Engaging in ethnographic methodologies has afforded the researcher a comprehensive and abundant dataset and the opportunity to gain proficiency in a different language, attain an alternate perspective of reality, and gather perceptive and authentic data for other research pursuits (Wolcott 1999).

Discussions, interviews, and observations were conducted in the Aeta *sitios* for nearly two years, and community immersion was carried out for almost two months, serving as the primary method for gathering necessary study data. *Kapampangan* was used for the interviews because all informants spoke this dialect as their mother tongue. The researcher utilized the field diary technique, a camera for documentation, and a recorder to capture necessary study data. Key ethical considerations were employed such as informed consent, privacy and confidentiality, fairness and equity, and cultural sensitivity (Hassan 2023).

Two phases were utilized in the course of the study. The study's initial phase, involving focus group discussions (FGD) and observations with key community figures such as the 12 Aeta chieftains (elders), and experienced 30 *mangarbun,* was pivotal in uncovering the multifaceted narrative of *uling*. The purpose of the discussion is to provide a platform for sharing and analyzing ground realities. Within this phase, the researcher fosters open dialogue, encouraging uninhibited discussion and ensuring equitable engagement among all participants (Basnet 2018, 82). Observations delved into the intricate processes of producing *uling,* its role in meeting daily needs and contributing to economic stability, and the community's commitment to preserving this tradition alongside their natural resources. By exploring these themes, the phase aimed to provide a rich social context, enhancing understanding of the Aetas' unique cultural identity, their values, and their practices, thereby shaping broader perceptions and fostering greater appreciation of their heritage.

The initiative's second phase involves structured interviews with the Municipal Office for Indigenous Communities, and the Community Environment and Natural Resources Office (CENRO). This stage is crucial for updating the demographic profile of the Aeta communities. It also serves as a platform to explore the array of municipal programs designed to foster cultural and environmental consciousness, alongside promoting the economic endurance of the Aeta people. Such programs are vital in ensuring that the Aeta communities can maintain their unique cultural identity while adapting to environmental changes and pursuing sustainable economic growth. These efforts align with broader sustainability goals that recognize the importance of integrating indigenous wisdom and practices in environmental stewardship. The collaborative approach between the Aeta communities and municipal bodies aims to create a synergy that benefits both the cultural preservation and the ecological well-being of the region.

The FGD, interviews, and observations have helped the researcher better understand the Aeta traditional upland practices known locally as *pamangarbun*, demonstrating that such traditions foster self-sufficiency and play a fundamental role as their resource base.

Results and Discussion

The Municipality of Capas, Tarlac, is home to 36 Aeta *sitios* —culturally and ethnically inhabited areas dispersed across the six barangays. These *sitios* include Sitio Kalangitan in Barangay Cut-Cut, Sitio Sapang Kawayan in Barangay Aranguren, Sitio Batong Gating, Sitio Bueno Proper, Sitio BRC, Sitio Manibokyot, Sitio Mapagla, and Sitio Ungloy in Barangay Bueno. Additionally, there are Sitio Bilad, Sitio Flora, Sitio Kawayan, Sitio Maruglo Proper, Sitio Sta. Monica, Sitio Tabo, and Sitio

Figure 2: Aeta people of Sition Manabayukan, Capas, Tarlac

Yangca in Barangay Maruglo. Moreover, Barangay Patling has Sitio Binyayan and Manabayukan (Fig. 2), while Barangay Sta. Juliana has Sitio Abo, Sitio Alunan, Sitio Bot-ol, Sitio Bulacan, Sitio Bunga, Sitio Doray, Sitio Kalawakan, Sitio Maalyabon, Sitio Manala, Sitio Pantol, Sitio Patalbato, Sitio Payapa, Sitio Pilien, Sitio Pinya, Sitio Pisapungan, Sitio Pula, Sitio Sta. Juliana Proper, Sitio Tarukan, and Sitio Yayang (Official Website of National Commission on Indigenous Peoples Region III 2022). The NCIP has documented these *sitios* which are crucial to preserving and protecting the Aeta communities' cultural heritage. As of the latest census conducted on May 1, 2020, by the Philippine Statistics Authority (PSA), the total population of Capas, Tarlac, is 156,056, of which the number of registered Aeta individuals has yet to be determined.

The Aeta *sitios* are indigenous groups that primarily inhabit the 5,764.43 hectares of forestlands of Capas, Tarlac. Natural resources play a vital role in the livelihoods of many poor Aeta households that rely on the forest for their basic needs. Study shows that their major livelihoods are the same as the Aeta tribes in Northern Luzon which includes various activities, such as rice production, livestock production, foraging, sugarcane, vegetable farming, fishing, hunting, paid labor, and charcoal production (Ocampo and Ocampo 2014, 141). One of the practices in which the Aeta people have been engaging for generations is their environmentally friendly methods of charcoal-making. The tradition of charcoal production has ancient origins, tracing back to the era when the ancestors of the Aeta ethnic groups imparted the knowledge of creating high-grade charcoal to their descendants. This cultural tradition has been passed down from generation to generation, and it remains an important source of income for many Aeta households in Capas. For the Aeta people, charcoal-making is a means of earning a living connecting with their roots and preserving their cultural heritage. They regard the forests and mountains as their ancestral land and take great pride in their ability to manage their resources sustainably. Through their unified conservation efforts and commitment to stewardship, the Aeta people are setting an example for others to follow.

Aspect	Details
Total Aeta sitios	36 sitios across six barangays
Barangays with Aeta sitios	Aranguren; Bueno; Cut-Cut; Maruglo; Patling; Sta. Juliana
Example sitio listings	**Cut-Cut:** Kalangitan; **Aranguren:** Sapang Kawayan; **Bueno:** Batong Gating, Bueno Proper, BRC, Manibokyot, Mapagla, Ungloy; **Maruglo:** Bilad, Flora, Kawayan, Maruglo Proper, Sta. Monica, Tabo, Yangca; **Patling:** Binyayan, Manabayukan; **Sta. Juliana:** Abo, Alunan, Bot-ol, Bulacan, Bunga, Doray, Kalawakan, Maalyabon, Manala, Pantol, Patalbato, Payapa, Pilien, Pinya, Pisapungan, Pula, Sta. Juliana Proper, Tarukan, Yayang.
Forestland area inhabited	5,764.43 hectares
Municipality population (PSA 2020)	156,056 (number of registered Aeta residents not determined)

Table 1. Community Distribution and Spatial Context

Group discussions with the Aeta chieftains revealed that the land they had long occupied was their ancestral property, which they had been occupying for generations. They could harvest and cut trees for house construction and charcoal making. Only twenty percent of the Aeta people engaged in charcoal-making luckily finished elementary education; 10 percent were high school graduates; 70 percent were uneducated. The study participants are predominantly male, aged 18 to 74 years, with an average age of about 30. Many of the charcoal-making production laborers had been working for over 57 years, together with their children and other relatives, using the same traditional and manual charcoal production technique. Of the thirty charcoal maker respondents, twenty-one are natives of Capas, while the rest migrated from Pampanga and Zambales. According to their recount, during the Mount Pinatubo eruption in 1991, there were about 30 households of charcoal makers in Sitio Bueno Proper alone.

The eruption swept tons of logs from the rivers linked to the mountains of Zambales. It was said that this calamity gave the Aeta people an opportunity to produce charcoal to survive. Due to the government's stricter rules on charcoal production, there are only 10 to 15 households in every *sitio* who are active charcoal makers.

The Aeta chieftains and charcoal makers deeply respect their environment and are committed to preserving its sanctity. They follow the practices of their ancestors, which include strict regulations on the use of certain tree species. Among these species are Bayabas (*Psidium guajava*), Kalibangbang (*Piliostigma malabaricum*), Eucalyptus, Ipil-ipil (*Leucaena leucocephala*), Mangga (*Mangifera indica*), Kakawate or Madre de Cacao (*Gliricidia sepium*), and Sampalok (*Tamarindus indica*). They only cut down trees that are permitted. However, in cases where prohibited trees, such as Acacia, Mahogany, and Gmelina, are damaged by natural disasters, they leave the stumps intact or trim the branches to allow for regeneration for five to seven years before harvesting. This practice ensures that the trees can replenish themselves, and the Aeta people

Attribute	Details
Sample size	30 charcoal makers; 12 chieftains
Gender	Predominantly male
Age range / average	18–74 years; ~30 years average
Educational attainment	20% finished elementary; 10% high school; 70% no formal education
Place of origin	21 natives of Capas; the rest migrated from Pampanga and Zambales
Years engaged in charcoal-making	Up to 57 years; multi-generational practice
Active charcoal-making households	≈10–15 households per sitio currently active

Table 2. General Demographic Profile of Aeta Charcoal Makers

can continue to harvest mature and large trees for various purposes, including charcoal production, without depleting the area's resources.

The Aeta community produced *uling* every month from January to May, predominantly during the summer season. They cease producing *uling* from June to December, due to the rainy seasons. The techniques utilized for charcoal making depend on various factors, such as the quality and type of the raw material, the desired properties of the final product, and the available resources and equipment. A charcoal maker must also be equipped with an ax or machete for cutting branches, a chainsaw for big logs, and buckets of water to control the fire and smoke. The complete process of charcoal production takes approximately five to seven days.There are two methods of charcoal production. These methods of charcoal production require minimal investment and rely on readily available resources, such as wood, enabling individuals to create a source of income. It's a testament to the ingenuity of communities to utilize accessible technology to sustain their livelihoods, even in the face of economic challenges (Foley 2024, 17–18). The first, the *binulkan*, involves burning piles of wood on the upper layer of the soil (Fig. 3).

Figure 3: Charcoal production using binulkan method.

The *binulkan* method involves the *salansan* (piling) process of arranging wood horizontally or vertically, forming a structure resembling a *punso* (earth mound). The *binulkan* method is more traditional, cheapest, and simplest, and is generally used by producer-farmworkers (Inzon et al. 2016). Ninety percent of Aeta large-scale charcoal makers have been using the common method called the *binulkan* technique to produce high-quality charcoal for generations. This method involves forming a man-made *punso* (mound). The base of the *punso* approximately has a diameter of 10 or 12 feet and is six to seven feet tall. The next step is kamada, i.e., stacking various wood pieces horizontally or vertically in a radial pattern. It has been noted that the success of producing a high-grade *uling* lies in its skillful *kamada*. Woods stacked must be uniform in length but different thicknesses (e.g. 2 cm× 2 cm, 3 cm × 3 cm, 4 cm × 4 cm, 6 cm× 6 cm, 6 cm × 8 cm). Once the woods are stacked, the pile is covered first with *talahib* (native tall grass) or *dayami* (hay) and then with *gabun* (soil), leaving a small opening from the apex down to the central vertex for air intake and ignition. Approximately 30 pieces of *bikal* (bamboo wood poles)

about six feet high are then placed around the circumference of the *punso*. The *bikal* poles are then attached with two layers of *sapuang saging* (banana trunks) or Indigenous bamboo called *buho* (*Schizostachyum lumampao*) eight cm in width and three-hundred four cm in length, to provide structural support for the *punso*. The pile is then set on fire using *parikit* (burned wood) and allowed to burn slowly for two to three hours. During this time, the air intake is carefully regulated to prevent complete combustion, which results in the production of high-quality charcoal. The slow-burning process allows the wood to turn into charcoal while retaining its shape and size. The resulting charcoal is then extracted from the mound using a rake, cooled by covering it with new soil and collected for distribution.

The second, the *de bobida*, entails burning wood using an underground *pugon* (kiln). The *de bobida* method uses a circular dug pit kiln, measuring one meter in diameter and 75 centimeters deep (Fig. 4). At the front of the kiln, there is a square-shaped pit with a 15-centimeter aperture for igniting the wood and allowing air into the kiln. At the rear of the kiln, there is a small hole, approximately 10 centimeters in diameter, which acts as an outlet for air and smoke. In addition, a small trench at the base of the kiln connects the air inlet to the smoke outlet, allowing air and fire to travel underneath the wood. The wood is stacked using steel planks. Stacking begins with small pieces of dried wood near the air-inlet to be used as

Figure 4: The de bobida dug pit kiln (pugon)

kindling to ignite the kiln. Small wood is placed at the bottom, medium-sized wood in the middle, and large pieces at the top. Small branches are placed in empty spaces to serve as fire starters. The kiln is then lit using paper through an aperture leading to the kiln. The pit is then supported with steel rods and covered with scrapped GI sheets to cover the woods. Any smoke released from open gaps is covered with soil. As the smoke exits through the air outlet, all upper air gaps must be sealed. A customized exhaust steel pipe is placed at the mouth of the air outlet and covered with soil to keep it in place. The fire inlet is slightly covered with stones to prevent oxygen from passing through the kiln. The entire process concludes when no more smoke emerges from the exhaust pipe. The exhaust pipe is immediately removed, and the air inlet and outlet are then covered with soil. The cooling process takes 24 hours, and the charcoals are then packed to be sold. Ten percent of the charcoal makers using this technique say it is more convenient and low-cost. It can be used multiple times and is used by small-scale producers with the necessary resources and equipment to move the dirt.

The major advantage of traditional earth mound and pit kilns is that they require no capital investment. Anyone with access to wood can become a charcoal maker. This is why, in many areas, small scale charcoal making is used as a way of earning a living by some of the poorest people in the community. The *binulkan* method is still time-consuming and labor-intensive, but it yields exceptional and premium-quality charcoal. The study discovered that one successful process could produce 80 to 100 sacks, which can be sold to traders at a farmgate price of Php140.00 per sack. Repacking charcoal involves two types: spider and *pikit*. The term "spider type" pertains to the method of packaging charcoal, which consists in extending the material beyond the mouth of feed or fertilizer sacks and sewing it in a manner resembling a spider's web (Fig. 5). Typically, spider-type packaging weighs between 60 and 80 kilograms. The cost of the product in the local market varies from Php300.00 to Php350.00 per sack. In contrast, *pikit* is packaged in 38 to 50-kilogram sacks, resembling a sack of rice, and

is priced at Php200.00 to Php250.00 per sack (Fig. 6). Both spider and *pikit* are categorized as "Class A" due to the use of high-grade woods, such as *kakawate, ipil-ipil,* and *kalibangbang*, in forming the charcoal lumps.

Figure 5: The spider-bagged charcoal.

Figure 6: The pikit-baggged charcoal.

The process of charcoal production involves a collaborative agreement and partnership between the charcoal producers and the landowners. The proceeds from each sale are divided based on a predetermined ratio: the charcoal producers receive 80%, while the forest owners receive 20%.

Step	Description	Tools Used	Duration	Cultural Notes
1. Wood Collection	Harvest permitted species (Bayabas, Kakawate, Ipil-ipil, etc.); avoid prohibited species unless disaster-damaged	Axe/machete; chainsaw for large logs	Variable (prep phase)	Observes ancestral rules; regeneration period of 5–7 years for damaged trees
2. Pile Construction	Arrange wood in mound (*binulkan*) or pit (*de bobida*); cover with grass and soil	Bamboo poles (*bikal*), banana trunks (*sapuang saging*), soil, tall grass (*talahib*)	Several hours to 1 day	*Kamada* stacking is a skill passed down through generations
3. Carbonization	Controlled burning; regulate airflow to prevent complete combustion	Firewood (*parikit*), buckets of water	5–7 days (binulkan)	Slow burn ensures high-grade charcoal; reflects patience and ancestral technique
4. Cooling	Cover with soil; allow charcoal to cool	Soil; rake	~24 hours	Cooling preserves shape and quality
5. Charcoal Collection	Extract, rake, and pack charcoal for distribution	Rake; sacks (*spider type* or *pikit*)	After cooling phase	Income shared: 80% producers, 20% landowners; viewed as cultural heritage

Table 3. Charcoal-Making Process (Aeta Community, Capas, Tarlac)

According to this study, the production of charcoal depends on the market demand and necessities of the Aeta people. Charcoal is in demand in local markets, hotels, restaurants (i.e., fast food chains, *carinderia*/*turo-turo* [small eateries], and barbeque stands), and households as a source of fuel for cooking. Despite the availability of modern alternatives such as electricity, kerosene, and LPG, some households still opt for charcoal due to its cost-effectiveness, accessibility, and familiarity. According to the "Infographics | Philippine Statistics Authority | Republic of the Philippines" (2020) we can determine that out of 26,393,906 total households in the Philippines, 1,900,361.232 (7.2%) households use charcoal for cooking. Aeta households rely on charcoal to cope with poverty because they lack access to other energy sources, such as electricity, gas, or solar power.

To ensure sustainability and legality in the production and trade of wood charcoal, the Department of Environment and Natural Resources (2022) in the Philippines has issued Administrative Order 2022-05 (DAO 2022-05) on rules and regulations "to protect and advance a balanced and healthful ecology in accord with the rhythm and harmony of nature and to promote sustainable management of natural resources." Under the DAO 2022-05, charcoal producers are obligated to obtain a Wood Charcoal Production Permit (WCPP) that remains valid for three years and is subject to renewal for an equivalent duration. Producers must initiate the renewal process 60 days before the expiration of their permit to prevent

any disruptions in their production operations. This stipulation serves to ensure that the raw materials utilized in wood charcoal production originate from legitimate sources to prevent illegal logging and to promote the responsible use of forest resources. Transportation of charcoal is permitted only if the traders and middlemen involved possess a Wood Charcoal Transport Permit (WCTP), allowing a point-to-point shipment of only two days. It is also worth knowing that all Aeta charcoal makers in Capas are registered on the WCPP and traders with WCTP. Both stakeholders remain obedient to the conditions and guidelines stipulated in the DAO 2022-05.

Aspect	Details
Primary livelihoods	Rice farming; livestock; foraging; sugarcane; vegetable farming; fishing; hunting; paid labor; charcoal production
Seasonality of charcoal-making	Active January–May (dry season); production ceases June–December (rainy season)
Common methods	Binulkan (earth mound): ~90% of large-scale makers); De Bobida (pit kiln): ~10%)
Tools commonly used	Axes/machetes; chainsaw for large logs; buckets of water for fire/smoke control
Yield per successful cycle	Binulkan: ~80–100 sacks; De Bobida: ~30–50 sacks
Species rules	Permitted: Bayabas, Kalibangbang, Eucalyptus, Ipil-ipil, Mangga, Kakawate, Sampalok; Prohibited (unless disaster-damaged): Acacia, Mahogany, Gmelina; Regeneration period: 5–7 years
Permits & compliance	Producers registered under DENR DAO 2022-05: WCPP (production) and WCTP (transport); reported compliant among Aeta producers in Capas

Table 4. Livelihoods and Production Patterns

The Aeta indigenous communities express their appreciation to the local government unit (LGU) of Capas, Tarlac, and particularly to their respective Community Environment and Natural Resources Office (CENRO) for their unwavering support. The LGU's continuous programs aimed to raise awareness among the Aeta people about climate change, solid waste management, and current issues and problems in environmental management have been highly effective. These initiatives have contributed significantly to the Aeta's capacity to understand and address complex environmental issues in the region. From 2017 to 2023, through the combined initiative of the *Sangguniang Bayan* (Municipal Council), CENRO, *Sangguniang Barangays* (Barangay Councils), and its *kabalens* (citizens), about 25,000–40,000 *punla* (seedlings) of Bayabas, Madre Cacao, Sampalok, Rambutan, and various native kinds of wood were planted, covering from 20 hectares to 50 hectares of land in various barangays of Capas. The Aeta people particularly took part in nurturing the common *punlas* of Gmelina and Mahogany in their respective sitios.

Upon completing comprehensive observations and worker interviews, the study discovered that the workers were not provided with the necessary personal protective equipment (PPE) to perform their job duties safely. The PPE required for the job included gloves, full-face masks, and specialized working attire. This failure to provide adequate PPE has resulted in severe health consequences for workers, including respiratory issues such as coughing, chest and back pain, and even pneumonia. Despite reporting these symptoms, workers have been unable to seek medical attention due to financial constraints, leaving them susceptible to further health complications.

Conclusion and Recommendations

This study aimed to assess the sustainability of the charcoal-making tradition of the Aeta in the Municipality of Capas, Tarlac. Specifically, it attempted to profile charcoal producers and describe the charcoal production process in the area to develop and test suitable criteria and indicators for its sustainability (Rondina 2018). There has been a marked increase in the number of farmers involved in charcoal production since 2020 which coincides with the COVID-19 pandemic in Central Luzon. Charcoal producers in Capas, Tarlac, can be classified as producer–landowners, producer–regular farmworkers, and producer–seasonal farmworkers. The first two types make charcoal to augment their income, while the third type enters into full-time charcoal production because of unemployment and the opportunity for a stable income. The charcoal-making process in Capas, Tarlac, employs one of the oldest and simplest methods of charcoal production—the *binulkan* method. One production cycle lasts up to one month and involves wood harvesting, kiln preparation, carbonization, and packaging. Charcoal is a widely used and affordable fuel in the Town of Capas, especially for low-income households. It is also a source of livelihood for many people who produce it from wood or agricultural waste. Charcoal is a valuable commodity for many people in developing countries. It provides a livelihood for those who produce it, often in rural areas where other economic

opportunities are scarce. It also serves as an affordable and reliable fuel for cooking, especially in urban areas where electricity and gas are expensive or unavailable. Charcoal production has social and environmental impacts, both positive and negative, that need to be carefully considered and managed.

The small-scale charcoal-making producers are in danger of losing their livelihood because large companies produce charcoal in a sophisticated way that affects the production and sales by the Aeta. In addition, the Aeta tribe has taken proactive steps to replenish the trees they use by planting seedlings in their vast ancestral lands in Capas, Tarlac. They clearly understand that the environment is a precious resource that must be nurtured and preserved for future generations. Their sustainable practices and efforts toward reforestation not only help preserve the environment but also contribute to the well-being of their community. The Aeta people have been recognized for their excellent conservation practices and sustainable charcoal production. It is not just a method of producing charcoal; it is also a significant part of their cultural heritage.

One Aeta charcoal maker in Sitio Bueno Proper have splendidly revealed in this research their truest distinctiveness: *"Tau ke pung bunduk. Keti na kami mibait king kapamilatan da reng kekaming ninunu. Kaluguran at pakamalan miya ing kabundukan. Ing gabun grasya yang menibat king Apung Guinu. E kami pu kaingeru na manyira king kalikasan, tau kami pung mangarbun mu na mamasa king upaya na ning kalikasan. Pakakalulu ke man pu king mata dareng tau, pero payapa kami pilubluban na ing uling ming gagawan ibat king mayap a paralan. Mate ke man keti yatu pero ing kekaming ayumpisang tradisyun alang-angga rang ipamana at pagmasusian ding kekaming pipumpunan at saling-lahi. Makinabang kami king uling, at king gawa ming uling makinabang la reng kerakalan* (We are a community of mountain people who have lived here for generations, and we deeply cherish the natural beauty and resources of our land. We believe that God has blessed us with this bounty, and it is our responsibility to care for it and use it sustainably. We are not like the *kaingeros* who recklessly destroy the environment for profit. Rather, we are charcoal makers who rely on the forest for our livelihoods. We are proud of the fact that the charcoal we produce is made using ethical and responsible means. Though we may be poor, we take pride in our work and the benefits it provides for both us and our customers. We know that one day we will pass on, but our legacy of responsible and sustainable charcoal production will endure for generations to come)." Overall, charcoal production can have negative environmental impacts, but these effects can be mitigated through careful resource management, replanting practices, and exploring alternative sources for production.

Recommendations

Drawing upon the analysis and insights gathered from the respondents of this study, the following recommendations are formulated to educate and support Aeta charcoal makers through comprehensive approaches. These approaches encompass promoting sustainable practices, offering economic incentives, and increasing awareness of the cultural significance of their craft. To effectively support them, the following approaches are recommended:

Educate and Promote Sustainable Practices to the *Aeta* people: It is important to educate them about the benefits of using sustainable wood sources and efficient production techniques to minimize environmental impact. By doing so, we can encourage the adoption of eco-friendly methods in the production of charcoal. Introducing Green charcoal, also known as biochar, is an environmentally friendly alternative to traditional charcoal. It is produced through clean processes from biomass, which is often considered waste material, such as sugarcane residues, coconut husks, rice hulls, and other organic matter (Jinke Van Dam et al. 2017). This method provides a sustainable energy source with minimal environmental impact and economic benefits to communities involved in its production.

Let's support our own: Buy Local: It is important to support charcoal makers who use sustainable practices. We should make an effort to find and buy charcoal that is made locally. By doing this, we help maintain the traditional methods of charcoal production and support the local economy, while also respecting and valuing regional craftsmanship (Tagupa 2020).

Registering Charcoal Making in the Tourism Industry: Charcoal production could become a unique and valuable part of the Philippine tourism sector, offering a one-of-a-kind blend of educational, cultural, and hands-on experiences. It is essential to ensure that such initiatives are developed sustainably and ethically while demonstrating respect for the environment and the local communities involved.

Attainable and Sustainable Advocacy and Policy: It is crucial to advocate for policies that support sustainable forestry and help traditional charcoal makers transition to eco-friendly methods. By actively participating in advocacy efforts, we can strive to create a supportive environment for sustainable charcoal production. Workshops and Education: Organize workshops led by the *Aeta* charcoal makers to teach traditional charcoal making, preserving the skills for future generations. Educating people can be a venue for the participants to understand that charcoal can be a medium for filtering water and soil (Tekinalp and Demir 2024).

Research and Development: Encourage the support and funding of research aimed at developing more sustainable methods for charcoal production and exploring alternative options that traditional producers could implement. It's important to note that there are organizations in the Philippines that provide funding for research on charcoal production. Some of these organizations include the Foundation for the Philippine Environment (Est. 1992), the World Wide Fund for Nature-Philippines (Est. 1997), and DOST-Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (Est. 2011).

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Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study; all data used were obtained from previously published sources as cited in the reference list.

References

Anda, Redempto D. (2015). Summer not all beach in Palawan; it is the season to burn forests. INQUIRER.net. https://newsinfo.inquirer.net/684378/summer-not-all-beach-in-palawan-it-is-the-season-to-burn-forests

Arnold, J. E. Michael, Gunnar Köhlin, & Reidar Persson. (2006). Woodfuels, livelihoods, and policy interventions: Changing perspectives. World Development, 34(3), 596–611. https://doi.org/10.1016/j.worlddev.2005.08.008

Basnet, Hom Bahadur. (2018). Focus group discussion: A tool for qualitative inquiry. Researcher: A Research Journal of Culture and Society, 3(3), 81–88. https://doi.org/10.3126/researcher.v3i3.21553

Department of Environment and Natural Resources. (2022). Administrative Order No. 2022-05. Republic of the Philippines. https://elibrary.bmb.gov.ph/elibrary/wp-content/uploads/2023/05/dao2022-05.pdf

Espaldon, Marya Laya, Zenaida Sumalde, Carmelta Rebancos, & Antonio Alcantara. (2016). Who wants to adopt sustainable charcoal production? Determinants and willingness to adopt sustainable practices among small-scale producers in Quezon Province, Philippines. Journal of Environmental Science and Management, Special Issue 2, 84–92. https://doi.org/10.47125/jesam/2016_sp2/08

Foley, Gerald. (2024). Charcoal making in developing countries. Routledge. https://doi.org/10.4324/9781003479949

Hassan, Muhammad. (2023). Ethical considerations: Types, examples and writing guide. Research Method. https://researchmethod.net/ethical-considerations/

Inzon, Maria Rowena Beatriz, Ma. Victoria Espaldon, Leonardo Florece, Carmelita Rebancos, & Antonio Alcantara. (2016). Environmental sustainability analysis of charcoal production in Mulanay, Quezon, Philippines. Journal of Environmental Science and Management, 93–100. https://dx.doi.org/10.47125/jesam/2016_sp2/09

Lattimore, B., C. T. Smith, B. D. Titus, I. Stupak, & G. Egnell. (2009). Environmental factors in woodfuel production: Opportunities, risks, and criteria and indicators for sustainable practices. Biomass and Bioenergy, 33(10), 1321–1342. https://dx.doi.org/10.1016/j.biombioe.2009.06.005

Mandate, Vision and Mission – National Commission on Indigenous Peoples. (n.d.). https://ncip.gov.ph/mandate-vision-and-mission/

Mercado, Juan L. (2015). Buzzwords rehashed. INQUIRER.net. https://opinion.inquirer.net/84141/buzzwords-rehashed

Mwampamba, Tuyeni H., Adrián Ghilardi, Klas Sander, & Kim Jean Chaix. (2013). Dispelling common misconceptions to improve attitudes and policy outlook on charcoal in developing countries. Energy for Sustainable Development, 17(2), 75–85. https://dx.doi.org/10.1016/j.esd.2013.01.001

Ocampo, Ronald O., & Rema Ocampo. (2014). The economic life of the Negritos of Luna, Apayao. Asia Pacific Journal of Multidisciplinary Research, 2(1), 139–142. https://www.apjmr.com/wp-content/uploads/2014/02/Paper_ID_2014-2-048.pdf

Official Website of Municipality of Capas, Province of Tarlac. (2020). Geography. https://www.capastarlac.gov.ph/geography/

Official Website of National Commission on Indigenous Peoples Region III. (2022). Ancestral domains. https://www.ncipr3.com/ipsiccs-in-region-3/ancestral-domains/

Rondina, Genaro. (2018). Charcoal production in San Narciso, Quezon, Philippines and Laudato Si: An ethical consideration. https://www.dlsu.edu.ph/wp-content/uploads/pdf/conferences/arts-congress-proceedings/2018/nstcc-02.pdf

Sangasubana, Nisaratana. (2014). How to conduct ethnographic research. The Qualitative Report. https://doi.org/10.46743/2160-3715/2011.1071

Sharma, Hermant Lata, & Chiranjit Sarkar. (2019). Ethnography research: An overview. International Journal of Advance and Innovative Research, 6(2), 4–5. https://www.researchgate.net/publication/333701617_ETHNOGRAPHY_RESEARCH_AN_OVERVIEW

Tekinalp, Mertkan Fahrettin, & Zeki Demir. (2024). Black to green: Charcoal's role in advancing environmental sustainability. Chemistry Research Journal, 9(2), 108–113. https://chemrj.org/download/vol-9-iss-2-2024/chemrj-2024-09-02-108-113.pdf

Tindowen, Darin Jan C. (2016). The economic life of the Aetas of Northern Philippines. Khazar Journal of Humanities and Social Sciences, 19(4), 97–109. https://doi.org/10.5782/2223-2621.2016.19.4.97

Appendices

No appendices are attached to this study.