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**Sustainability Practices and Community Resilience:
Mapping Indigenous Wisdom for Urban Development
through Lived Experiences of Iraya Mangyans**

Franco, D.P., De Amboy, S. R., Baldonado, A.L.B., & De Loyola, R.B.

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Abstract

Indigenous knowledge systems offer critical insights into sustainability and resilience, yet they remain marginal in dominant development and urban planning frameworks. This study examines how the sustainability practices of the Iraya Mangyans in Mindoro contribute to community resilience and how these practices may inform urban development strategies. Using a qualitative phenomenological approach, the research documents lived experiences related to environmental stewardship, governance, livelihoods, cultural continuity, and spiritual ecology. Findings reveal that resilience is produced through integrated socio-ecological practices rooted in ethical responsibility, collective decision-making, intergenerational knowledge transmission, and culturally embedded environmental relations. The study contributes to sustainability science by articulating Indigenous resilience as a holistic system rather than a set of discrete practices, offering policy-relevant insights for culturally responsive and ecologically grounded urban development.

Keywords: Indigenous knowledge; sustainability practices; community resilience; Iraya Mangyans; urban development; socio-ecological systems

Introduction

Indigenous knowledge systems have increasingly been recognized as critical to advancing sustainability and resilience in the context of accelerating environmental change, socio-economic disruption, and climate-related risks (Adger et al., 2011; United Nations, 2018; IPBES, 2019). Rooted in long-term interaction with specific landscapes, indigenous sustainability practices embody adaptive strategies that integrate ecological stewardship, social organization, livelihood systems, cultural continuity, and spiritual worldviews (Berkes, 2012, 2018; Gadgil et al., 1993). These practices offer relational and place-based perspectives that challenge technocratic and extractive development paradigms, particularly within rapidly urbanizing regions (Agrawal, 2002, 2005; Escobar, 2008).

In the Philippines, Indigenous Peoples continue to face systemic marginalization despite their demonstrated contributions to biodiversity conservation, food security, and climate adaptation (Bennagen & Royo, 2000; Cariño, 2012; United Nations, 2021). Development interventions have often failed to meaningfully engage indigenous epistemologies, instead reducing them to static cultural artifacts or instrumental resources for policy objectives (Nadasdy, 2005; Agrawal, 2002). This has resulted in the erosion of indigenous governance systems, ecological practices, and cultural identities, particularly in areas experiencing increasing state presence, infrastructure expansion, and market integration (Andrada, 2016; Ragragio, 2020; Padilla et al., 2020).

The Iraya Mangyans of Mindoro represent one of the least examined indigenous groups in Philippine sustainability and resilience scholarship, despite a rich body of ethnographic and community-based research documenting their ecological knowledge, customary governance, and cultural lifeways (Bacdayan, 2005; Postma, 2011; Mandia, 2013). Existing studies have explored specific dimensions of Iraya life, including forest stewardship (Cadiz, 2014; Caoli & Tenorio, 2023), livelihood adaptation (Luna et al., 2019; Logdat, 2023), cultural transmission (Buenavista, 2015; Balansag et al., 2020), and governance practices (Barrios, 2010; Mendoza & Tolentino, 2022). However, these works remain largely fragmented, offering limited synthesis of how Iraya sustainability practices collectively produce community resilience.

Moreover, while global sustainability discourse increasingly calls for the integration of indigenous knowledge into urban development and planning (Johnson et al., 2016; McGregor, 2018; Salazar, 2020), empirical studies that map indigenous lived experiences to urban resilience frameworks remain scarce, particularly within the Philippine context. This gap limits the ethical and practical translation of indigenous sustainability practices into urban settings, risking misappropriation or superficial inclusion (Smith, 1999; Coulthard, 2014).

This study addresses these gaps by examining the lived experiences of Iraya Mangyans to map sustainability practices as an integrated framework of community resilience. By foregrounding indigenous voices and relational knowledge systems, the research aims to contribute to sustainability science, indigenous studies, and urban development discourse, offering culturally grounded insights for building resilient and inclusive urban futures.

Methods

Research Design

This study employed a qualitative phenomenological research design to explore the sustainability practices and community resilience of the Iraya Mangyans through their lived experiences. Phenomenology is particularly appropriate for indigenous research as it

foregrounds meaning-making, relationality, and embodied knowledge derived from everyday practices rather than externally imposed analytical categories (Smith, 1999; Creswell & Poth, 2018). The design allowed for an in-depth examination of how Iraya Mangyans understand, practice, and transmit sustainability within their socio-ecological and cultural contexts, aligning with calls to privilege indigenous epistemologies in sustainability research (Berkes, 2012; Agrawal, 2002).

Rather than treating sustainability as a predefined technical construct, the study adopted an indigenous-centered analytical stance, allowing themes to emerge from participants' narratives. This approach responds to critiques of extractive research methodologies and supports decolonizing knowledge production by situating indigenous peoples as knowledge holders rather than subjects of analysis (Smith, 1999; Nadasdy, 2005).

Research Site and Participants

The study was conducted in selected Iraya Mangyan communities in Mindoro, Philippines. The Iraya Mangyans are among the indigenous groups whose livelihoods, governance systems, and cultural practices remain closely linked to forested and upland environments (Postma, 2011; Mandia, 2013). These communities were purposively selected due to their continued engagement in traditional subsistence practices, customary governance, and intergenerational knowledge transmission.

Participants were identified using purposive and snowball sampling, consistent with qualitative and indigenous research practices (Creswell & Poth, 2018). Key informants included elders, community leaders, subsistence practitioners, and cultural knowledge holders who possessed experiential knowledge of sustainability practices and community decision-making. Participation criteria emphasized lived experience, community recognition, and willingness to share knowledge, rather than formal status.

Data Collection

Data were collected through in-depth semi-structured interviews and informal conversational engagements, consistent with culturally sensitive qualitative approaches. Interviews were guided by open-ended questions exploring environmental practices, livelihood strategies, governance processes, cultural transmission, and spiritual relationships with the land. This flexible format enabled participants to narrate experiences in their own terms, facilitating the emergence of indigenous meanings and values (Smith, 1999; Berkes, 2018).

Interviews were conducted in settings chosen by participants to ensure comfort and cultural appropriateness. With consent, conversations were audio-recorded and later transcribed verbatim. Field notes were maintained to document contextual observations, non-verbal cues, and researcher reflections, supporting analytical depth and reflexivity.

Data Analysis

Data analysis followed a thematic analysis approach, involving iterative coding and theme development. Transcripts were read multiple times to achieve immersion, after which initial codes were generated inductively from participants' narratives. Related codes were clustered into subordinate themes, which were then synthesized into superordinate themes reflecting broader dimensions of sustainability and resilience.

The analytical process was guided by principles of socio-ecological systems thinking, recognizing the interconnections among ecological, social, economic, cultural, and spiritual dimensions (Berkes, 2012; Folke et al., 2010). Rather than forcing alignment with existing frameworks, themes were refined to remain faithful to indigenous expressions while allowing analytical linkage to sustainability and resilience literature.

Trustworthiness and Rigor

To ensure rigor, the study applied established qualitative trustworthiness criteria: credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985). Credibility was enhanced through prolonged engagement, thick description, and the inclusion of verbatim excerpts. Dependability and confirmability were supported through an audit trail documenting coding decisions, theme development, and analytic reflections. Transferability was addressed by providing detailed contextual descriptions, enabling readers to assess relevance to other settings.

Reflexivity

Researcher reflexivity was integral throughout the study. The researcher continuously reflected on positionality, power relations, and potential interpretive bias, particularly given the historical marginalization of indigenous communities (Smith, 1999; Coulthard, 2014). Reflexive memos were maintained to critically examine how assumptions, disciplinary training, and institutional contexts might shape data interpretation.

Ethical Considerations

Ethical conduct followed principles of free, prior, and informed consent, respect for cultural protocols, and recognition of indigenous intellectual ownership (United Nations, 2007; Cariño, 2012). Participants were informed of the study's objectives, their voluntary participation, and their right to withdraw at any time. Pseudonyms were used to protect identities, and sensitive cultural knowledge was treated with care to avoid misrepresentation or exploitation.

Limitations

This study is limited by its qualitative scope and focus on specific Iraya Mangyan communities, which may constrain generalizability. Language translation and interpretation may also influence meaning despite careful transcription and contextual validation. Nonetheless, the study prioritizes depth, contextual accuracy, and ethical engagement, offering insights valuable for sustainability scholarship and urban development discourse.

Results

This section presents the findings of the study based on the thematic analysis of in-depth interviews with Iraya Mangyan participants. Analysis revealed a holistic and interrelated system of sustainability practices that collectively strengthen community resilience. Five superordinate themes emerged, each supported by multiple subordinate themes and illustrated through verbatim participant excerpts. These themes reflect how sustainability is lived, practiced, and transmitted within the Iraya Mangyan community rather than conceptualized as an abstract framework.

Superordinate Theme 1: Environmental Stewardship as Ethical Responsibility

Environmental stewardship emerged as a central pillar of Iraya Mangyan sustainability practices. Participants consistently framed environmental care not merely as a survival strategy but as a moral and intergenerational obligation. Subordinate themes under this category included selective harvesting, rotational farming, and protection of sacred natural sites. These practices reflect an ecological ethic grounded in restraint and respect for natural limits. One participant articulated this clearly, stating:

"We take only what is needed because the forest also needs to live for our children".

This excerpt highlights how environmental decision-making is guided by future-oriented responsibility. Sustainability, in this context, is inseparable from ethical accountability, where overextraction is viewed as a violation of communal and ecological balance.

Superordinate Theme 2: Collective Governance and Social Cohesion

Collective governance structures were identified as fundamental to maintaining social stability and adaptive capacity. Decision-making processes are participatory and consensus-based, ensuring that community actions reflect shared values and collective agreement. Subordinate themes included communal deliberation, shared labor, and conflict mediation through dialogue.

As one participant explained:

“Decisions are discussed until everyone agrees because peace in the community is important”.

This statement underscores how governance practices are designed to preserve harmony and trust. Social cohesion, reinforced through inclusive decision-making, enables coordinated responses to environmental and social challenges, thereby strengthening resilience.

Superordinate Theme 3: Adaptive Livelihood Strategies

Adaptive livelihood strategies formed another key dimension of sustainability. Participants emphasized diversification as a means of coping with environmental uncertainty and economic vulnerability. Subordinate themes included mixed subsistence activities, seasonal flexibility, and informal trade networks.

A participant noted:

“We do not rely on one source of income; farming, gathering, and trading help us survive”.

This excerpt illustrates livelihood adaptability as a deliberate strategy rather than a reactive measure. The integration of multiple livelihood sources reduces dependence on any single resource, enhancing household and community resilience.

Superordinate Theme 4: Cultural Continuity and Intergenerational Knowledge Transmission

Cultural continuity emerged as a sustaining force that reinforces both identity and resilience. Participants emphasized the role of elders, rituals, and everyday practice in

transmitting knowledge to younger generations. Subordinate themes included learning through observation, storytelling, and participation in communal activities.

One participant shared:

“Children learn by watching and joining us; this is how they remember who they are”.

This excerpt demonstrates how sustainability knowledge is embedded in daily life rather than formal instruction. Cultural continuity ensures that environmental practices, social norms, and ethical values are preserved across generations.

Superordinate Theme 5: Spiritual Ecology and Moral Regulation of Resource Use

Spiritual ecology was identified as a deeply embedded dimension of sustainability, shaping how the community relates to the environment. Participants described spiritual practices as guiding resource use, reinforcing humility, and regulating human interaction with nature. Subordinate themes included ritual observance, respect for spirits, and moral accountability.

A participant explained:

“Before planting or harvesting, we ask the spirits for guidance; it is respect that keeps us safe”.

This statement reflects how spiritual beliefs function as informal governance mechanisms, discouraging exploitative behavior and reinforcing ethical conduct. Spiritual ecology thus acts as an internalized system of environmental regulation.

Integrated Results

Taken together, the five superordinate themes Environmental Stewardship, Collective Governance, Adaptive Livelihoods, Cultural Continuity, and Spiritual Ecology form an interconnected sustainability system. Rather than operating independently, these dimensions reinforce one another. Environmental practices are sustained by spiritual beliefs; governance structures support equitable resource use; livelihoods adapt through cultural knowledge; and resilience is collectively maintained.

Synthesis of Findings

The results reveal that sustainability among the Iraya Mangyans is holistic, relational, and practice-based. Sustainability is not treated as a separate domain but is woven into social relations, cultural identity, spiritual values, and everyday decision-making. Community resilience emerges from this integration, enabling the Iraya Mangyans to respond adaptively to environmental and social change while maintaining cultural integrity.

These findings provide a grounded empirical basis for understanding indigenous sustainability practices and offer insights relevant to broader discussions on resilience and sustainable development.

Discussion

Sustainability as a Holistic Socio-Ecological Practice

The findings demonstrate that sustainability among the Iraya Mangyans is enacted as a holistic socio-ecological practice, where environmental stewardship, social relations, cultural norms, and spiritual accountability are inseparable. Participants' narratives reveal that land use, food production, and forest care are embedded within kinship systems and moral obligations, rather than governed by extractive or efficiency-driven logics. This relational framing resonates with Indigenous sustainability scholarship that conceptualizes sustainability as a lived system of reciprocal relationships between humans and non-human entities (Berkes, 2018; Kimmerer, 2013). Such an orientation aligns with resilience theory emphasizing adaptive capacity rooted in social cohesion and ecological embeddedness, rather than technocratic interventions alone (Folke et al., 2013).

The integrated nature of Iraya Mangyan sustainability practices challenges dominant sustainability models that prioritize growth, efficiency, or technology-driven solutions. Instead, ethical restraint, interdependence, and continuity of knowledge emerge as key drivers of long-term resilience. Practices such as selective harvesting, rotational farming, and protection of sacred natural sites reflect sustainability as a lived ethic rather than a technical or policy-driven construct. These insights support claims that Indigenous knowledge systems provide operational and culturally grounded frameworks for long-term sustainability and socio-ecological continuity (IPBES, 2019; United Nations, 2021).

Environmental Stewardship as Ethical Responsibility

Environmental stewardship emerged as a central pillar of Iraya Mangyan sustainability, framed as both an ethical and intergenerational responsibility. Participants emphasized that

caring for the environment is not merely about survival but is morally bound to future generations. As one participant stated, “We take only what is needed because the forest also needs to live for our children” (P4). Subordinate practices such as selective harvesting, rotational farming, and protection of sacred sites illustrate how ecological decisions are guided by moral obligation rather than external enforcement.

This approach aligns with Berkes (2018) and Kimmerer (2013), who argue that Indigenous sustainability is relational and value-laden, rooted in reciprocal responsibilities between humans and nature. By internalizing these ethical norms, communities proactively prevent overexploitation, reinforcing ecological balance and social cohesion (Folke et al., 2013). Moreover, the Iraya Mangyan experience resonates with IPBES (2019), demonstrating that Indigenous knowledge provides operational sustainability models that integrate environmental, social, and spiritual considerations. Such ethical stewardship challenges contemporary sustainability frameworks that often emphasize efficiency or technical solutions over moral accountability.

Collective Governance and Social Cohesion

Collective governance structures were fundamental to maintaining social stability and adaptive capacity among the Iraya Mangyans. Decision-making processes are participatory and consensus-driven, ensuring that community actions reflect shared values. Subordinate themes include communal deliberation, shared labor, and conflict mediation through dialogue. A participant noted, “Decisions are discussed until everyone agrees because peace in the community is important”.

These practices reflect Indigenous institutions that manage common resources through social norms rather than formal regulatory mechanisms (Gadgil et al., 1993; Berkes, 2009). Consensus-based governance strengthens trust, encourages collective problem-solving, and enhances adaptive capacity in the face of environmental and social challenges (Folke et al., 2005). For urban and contemporary sustainability contexts, these findings suggest that participatory governance and inclusive decision-making mechanisms can improve resilience and social cohesion, particularly in settings characterized by fragmentation or hierarchical authority.

Adaptive Livelihood Strategies and Socio-Ecological Flexibility

Adaptive livelihood strategies were identified as key mechanisms for managing environmental uncertainty and economic vulnerability. Participants highlighted diversified subsistence activities, seasonal adjustments, and informal trade networks. One participant

explained, “We do not rely on one source of income; farming, gathering, and trading help us survive”.

These strategies illustrate deliberate diversification, reducing dependence on single resources while enhancing household and community resilience (Altieri & Nicholls, 2017; Macchi et al., 2008). Indigenous livelihoods demonstrate socio-ecological flexibility, emphasizing sufficiency and ecological balance over intensification or market dependency. Resilience literature confirms that diversity and adaptability buffer communities against ecological and economic shocks (Folke et al., 2002; Sinthumule, 2023). In urban planning, these principles suggest promoting flexible, diversified economic opportunities and valuing informal and mixed livelihoods as components of sustainable and resilient communities.

Cultural Continuity and Intergenerational Knowledge Transmission

Cultural continuity emerged as a critical mechanism for sustaining both environmental and social resilience. Knowledge is transmitted through observation, storytelling, and participation in communal activities rather than formal education. A participant shared, “Children learn by watching and joining us; this is how they remember who they are”.

This practice aligns with the concept of social memory (Berkes & Ross, 2013), where intergenerational knowledge transmission maintains adaptive capacity. Disruptions through formal schooling or integration into market economies can erode these pathways, weakening sustainability systems (Nazarea, 2006; Hiwasaki et al., 2014). Embedding sustainability knowledge in daily life ensures that environmental ethics, social norms, and livelihood strategies persist across generations, reinforcing the interdependence of culture, resilience, and socio-ecological stewardship.

Spiritual Ecology and Moral Regulation of Resource Use

Spiritual ecology forms a deeply embedded dimension of Iraya Mangyan sustainability. Rituals, respect for spirits, and consultation with ancestral guidance regulate resource use and reinforce moral accountability. As a participant explained, “Before planting or harvesting, we ask the spirits for guidance; it is respect that keeps us safe”.

Such practices function as informal governance mechanisms, discouraging exploitative behavior while fostering ethical environmental engagement. This perspective resonates with Cajete (1999) and Wilson (2008), who emphasize that Indigenous epistemologies view nature as an agent in socio-ecological systems. Spiritual accountability complements ethical stewardship and collective governance, internalizing norms that sustain both ecological

balance and community cohesion. Recognizing these moral and spiritual dimensions can enrich sustainability frameworks that are often narrowly technical or secular in focus (Whyte, 2018; Posey, 1999).

Applicability of Indigenous Sustainability Practices to Urban Development

The underlying principles of Iraya Mangyan sustainability ethical stewardship, participatory governance, adaptive livelihoods, and spiritual accountability offer significant insights for urban sustainability planning. While practices are context-specific, their relational logic and adaptive strategies can inform policy frameworks that seek inclusivity, resilience, and long-term responsibility. Scholars have noted that urban planning often marginalizes Indigenous knowledge, treating it as symbolic rather than operational (Reid et al., 2019; McGregor, 2018). Translating these principles requires adopting the values of reciprocity, social cohesion, and intergenerational responsibility into urban governance, resource management, and community engagement.

Urban environments are characterized by social fragmentation, inequality, and environmental pressures. Lessons from the Iraya Mangyan case suggest that fostering participatory governance, ethical stewardship, and livelihood flexibility can strengthen urban resilience. This might include community-managed green spaces, urban agriculture programs, or participatory environmental decision-making, reflecting an ethics-driven model of sustainability that prioritizes relationality over purely technical solutions (Johnson et al., 2016; Raymond et al., 2022).

Integrating Indigenous-informed principles into urban development further addresses issues of environmental injustice and long-term resource sustainability. By valuing plural epistemologies and ethical responsibility, planners can move beyond extractive or technocratic approaches, fostering communities that are socially cohesive, ecologically aware, and adaptive (Kabisch et al., 2017; Walker et al., 2013). Successful application emphasizes epistemic inclusion, engaging Indigenous peoples as knowledge partners to ensure ethical, cultural, and ecological considerations inform decision-making (IPBES, 2019; United Nations, 2021).

Figure 1. Thematic Matrix

Superordinate Theme	Subordinate Themes	Participant Quotes	Key Analytical Insights / Discussion Points
Sustainability as a Holistic Socio-Ecological Practice	Integration of environmental, social, cultural, and spiritual dimensions; selective harvesting, rotational farming, protection of sacred sites	Synthesized from multiple participant accounts	Sustainability is enacted as a relational, integrated system; ethical restraint, interdependence, and knowledge continuity are key; challenges technocratic, efficiency-driven models
Environmental Stewardship as Ethical Responsibility	Selective harvesting, rotational farming, protection of sacred sites; intergenerational responsibility	“We take only what is needed because the forest also needs to live for our children”	Stewardship is morally and intergenerationally grounded; overexploitation is socially and ethically sanctioned; Indigenous knowledge provides operational socio-ecological models
Collective Governance and Social Cohesion	Consensus-based decision-making, communal deliberation, shared labor, conflict mediation	“Decisions are discussed until everyone agrees because peace in the community is important”	Participatory governance strengthens trust, coordination, and adaptive capacity; supports community resilience and informs inclusive urban sustainability governance
Adaptive Livelihood Strategies and Socio-Ecological Flexibility	Diversified subsistence activities, seasonal adjustments, informal trade networks	“We do not rely on one source of income; farming, gathering, and trading help us survive”	Livelihood diversification reduces vulnerability; socio-ecological flexibility promotes sufficiency over intensification; principles can inform urban livelihood and resilience planning
Cultural Continuity and Intergenerational Knowledge Transmission	Learning through observation, storytelling, participation in communal activities	“Children learn by watching and joining us; this is how they remember who they are”	Cultural continuity maintains adaptive capacity, social norms, and environmental ethics; disruptions weaken resilience; critical for sustainability and urban knowledge integration
Spiritual Ecology and Moral Regulation of Resource Use	Ritual observance, respect for spirits, moral accountability	Before planting or harvesting, we ask the spirits for guidance; it is respect that keeps us safe”	Spiritual ecology functions as informal governance and moral regulation; complements ethical stewardship and governance; provides insights for ethics-driven sustainability frameworks
Applicability of Indigenous Sustainability Practices to Urban Development	Ethical stewardship, participatory governance, livelihood flexibility, epistemic inclusion, cultural and spiritual translation	Synthesized from thematic findings	Indigenous principles offer guidance for urban planning: relationality, stewardship, social cohesion, long-term responsibility; requires translation rather than replication; addresses environmental justice, ethical engagement, and resilience

Integrative Synthesis and Implications for Sustainability Policy

Taken together, the findings reveal that Iraya Mangyan sustainability practices constitute a coherent, integrated socio-ecological system. Environmental stewardship, collective governance, adaptive livelihoods, cultural continuity, and spiritual ethics are inseparable dimensions that collectively sustain resilience. Rather than peripheral cultural artifacts, these practices represent viable knowledge systems capable of informing contemporary sustainability and urban planning frameworks.

Policy and planning should move beyond superficial incorporation of Indigenous knowledge, embracing genuine epistemic inclusion where Indigenous communities are recognized as knowledge partners. Aligning with IPBES (2019) and UN (2021) frameworks, these findings advocate for sustainability strategies that prioritize relationality, ethics, and social cohesion alongside technical and economic considerations. Ultimately, sustainability is not merely an objective but a lived ethic that emerges from responsibility, reciprocity, and intergenerational accountability.

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