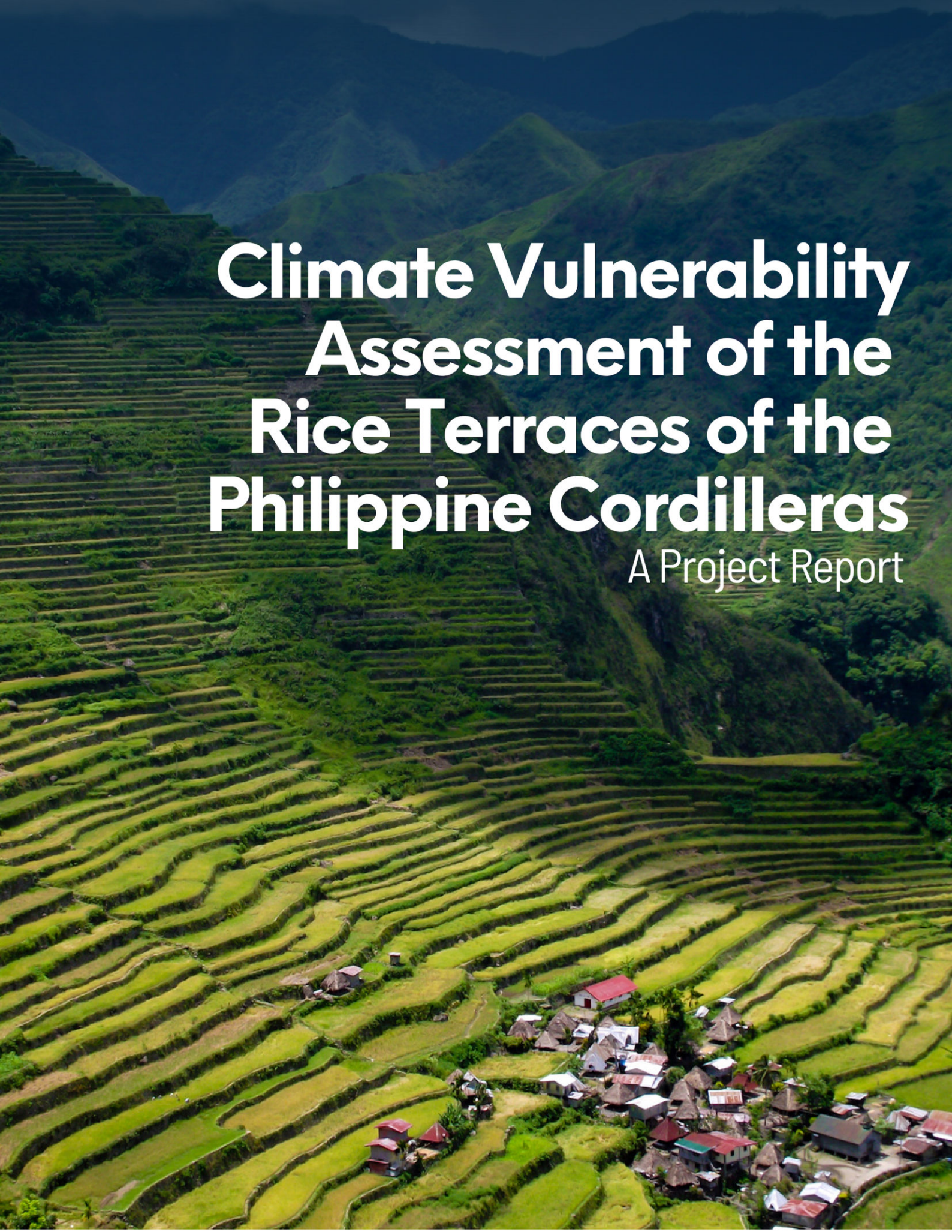

Climate Vulnerability Assessment of the Rice Terraces of the Philippine Cordilleras

A Project Report

International Council on Monuments and Sites
Conseil International des Monuments et des Sites
Komite ng Pilipinas

PRESERVING LEGACIES

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ICOMOS Philippines

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Climate Risk and Resilience at the Rice Terraces of the Philippine Cordilleras [Printed]

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Preface

There is no preparing for the corporeal current of awe that comes from standing before Ifugao rice terraces.

There is no preparing for the corporeal current of awe that comes from standing before Ifugao rice terraces.

At first, the iconic landscape can only be seen as shards of green peeking out between the buildings along the mountainous roads of Banaue. Then, suddenly, the curtain of concrete gives way to the monumental landscape that has made the Rice Terraces known as a natural world wonder. The carved terraces trace the contours of the terrain, each terrace an integral and intact step of an intergenerational ladder of knowledge from past to present to future.

On a calm October day like those of the Preserving Legacies Risk and Resilience Workshop on October 11 – 13, 2023, the view serves as a meditative exercise in monochrome, with the terraces verdant steps reflecting the sun's gentle cascading light. But because of climate change, the view can turn from pensive to perilous in extreme heat or when heavy rains drive landslides down the famed façade.

Heat waves, droughts, extreme rainfall, and other climate-related hazards pose a recurrent risk not only to the tangible integrity of terraces, but also to the traditions, indigenous knowledge, and intangible identity that anchor the Ifugao the land, their ancestors, and who they are as a community.

While the Ifugao Rice Terraces' awe-inspiring landscape and intangible heritage might be unique in the world, its existential threat from the climate crisis is not. **One in three natural sites and one in six cultural heritage sites** are threatened by climate change. Climate change today is **the fastest growing threat to historic sites** and the greatest danger to our planet's most spectacular natural heritage.

For the past year, our team has worked alongside community leaders that care for heritage at risk in ten countries around the world as part of a new initiative to preserve our cultural legacies from climate devastation. Partnered with the International Council on Monuments and Sites and the Climate Heritage Network, and funded by the National Geographic Society and Manulife, the **Preserving Legacies** project equips local leaders with the scientific knowledge and technical training to develop place and people-based climate change adaptation plans. Together, we've witnessed the consequences of more flooding at Petra, Jordan and Angkor, Cambodia, and listened to the fear of future loss from increased sea level rise in Cartagena, Colombia and Skellig Michil, Ireland.

On every continent, our species' cultural inheritance is at risk.

But the future cultural heritage in a climate changed world does not have to be a story of losing the places that make us who we are. Through Preserving Legacies, we are choosing to act and change the story to be about saving our cultures, traditions, and histories – and that work has started here in Banaue.

The Save the Ifugao Rice Terraces (SitMo) and ICOMOS Philippines serve as the ancestors of Preserving Legacies – the first in what will be a long weave of site custodians and special places around the world choosing to learn and act together to safeguard cultural and natural heritage. With gratitude and commitment of continued support, the Preserving Legacies team takes inspiration from this Risk and Resilience Report and the team of climate heritage heroes behind it.

Victoria Herrmann

Explorer, National Geographic

Preface

Often, in expert discussions on safeguarding heritage, there is a voice that isn't heard- that of the local community. Even quieter still is the voice of indigenous peoples. I am happy and proud to say that in this body of work, Ifugaos have led the discussion.

The work here happens at the extraordinary intersection of cultural heritage and climate science. It is an underexplored area, and an urgent one if we're to manage change and risk in preserving our heritage and our planet. This area of study grows even more specialized as our community-based assessment surfaced how central indigenous knowledge systems are to long-term, low-cost, adaptive solutions. Through generations of experience, these systems evolved into a cultural wisdom, based on an intimate knowledge of natural systems. Their cultural practices are profoundly rooted in ecological preservation, and are a model of sustainable land use.

As we look ahead for solutions to climate change, we should remember to also look back to what millenia of sustainable, traditional beliefs and practices can contribute. Because the result of insufficient action is far-reaching, and with consequences we cannot yet fully conceive. The seminal ICOMOS document, **The Future for Our Pasts: Engaging Cultural Heritage in Climate Action** states: "The changing climate is creating new risks even while it exacerbates existing vulnerabilities and multiplies traditional threats ... the ecosystems that underpin human well-being are declining globally at rates unprecedented in human history."

Globally, there is a small movement of rebirth in recapturing the wisdom of these traditions. For example, permaculture, initially considered a design system and now a global social movement, is actually based on a collection of traditional knowledge systems. Indeed, ample room for learning from indigenous cultures that have, for centuries, sustainably leveraged a harmonious balance with nature.

It's high time we capacitated heritage practitioners to position their sites for resiliency and sustainability. We are grateful to our colleagues at Preserving Legacies, especially Victoria Herrmann, and William Megarry for training our site custodians, and for the invitation and the trust to pilot this project with them. Additionally, we are privileged to join the project's global support system of international practitioners, mostly ICOMOS members, doing similar work in their own countries. Lastly, we thank National Geographic and Manulife for their commitment and generous support for our work at the intersection of cultural heritage preservation and climate change.

Maria Cristina Paterno

ICOMOS Philippines
President (2016-2023)

COLLECTIVE STATEMENT FROM OUR IFUGAO PARTICIPANTS

Conducting a climate vulnerability assessment of our own rice terraces heralds a shift towards genuine community engagement in climate resilience efforts. By entrusting the assessment process to us, the Ifugao communities intimately connected with the terraced landscapes, we acknowledge our own people's knowledge, experiences, and insights into the ever complex dynamics of our environment. This approach ensures that the assessment captures the nuanced vulnerabilities and resilience strategies unique to us, which are often overlooked in conventional assessments led by external experts. Genuine community participation empowers us to share our lived experiences, traditional knowledge, and observations of environmental changes, thereby enriching the assessment with authentic data that accurately reflects the realities on the ground.

Furthermore, the implications of such indigenous-led climate assessments extend beyond mere data collection. By involving us as active participants rather than passive subjects, the assessment fosters a sense of ownership and agency among our communities in shaping our climate resilience strategies. The insights gleaned from the assessment serve as a robust foundation for informed decision-making, enabling policymakers and other stakeholders to tailor interventions that align with our specific needs and priorities. Thus, indigenous-led climate vulnerability assessments not only contribute to more effective and contextually relevant climate actions but also promote equity, inclusion, and empowerment within the broader climate resilience discourse.

Truly, the rice terraces, our enduring symbol of heritage and resilience, have stood as silent sentinels through the annals of time, witnessing the vicissitudes of history and the birth and death of generations. Yet, as we confront the specter of climate change, a challenge looms before us, one that seems to transcend the bounds of mortal understanding. It is a trial of unparalleled magnitude, testing the very core of our existence and threatening the sanctity of our ancestral lands. In response, we have resolved to embark on a journey of self-discovery and communal empowerment, spearheaded by an indigenous-led climate vulnerability assessment.

This assessment, guided by the wisdom of our ancestors and the collective insights of our community, represents a pioneering step towards understanding and addressing the existential threats posed by climate change. By engaging in genuine dialogue and participatory research, we endeavor to unearth the nuanced intricacies of our environmental landscape and glean invaluable insights into adaptation and mitigation strategies.

Through this process, we aspire not only to safeguard our cherished rice terraces but also to fortify the resilience of our people and preserve our cultural heritage for generations to come. As we navigate the uncharted waters of climate uncertainty, we draw strength from the lessons of the past and the indomitable spirit of our community, steadfast in our commitment to forge a path towards a sustainable and harmonious future. Moreover, we are open to integrating the knowledge of climate science as an additional tool in our arsenal, recognizing the importance of harnessing all available resources to combat the challenges posed by climate change.

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I. Introduction

Introduction

1.1 The Global Preserving Legacies Project

As of November 2022, the average global temperature is 1.2°C higher than pre-industrial level (Climate Action Tracker, 2022). With this, the Intergovernmental Panel on Climate Change Sixth Assessment Report has found that every region on earth has already been affected by climate change (IPCC AR6 - Working Group I Contribution, 2021), with the Philippines ranking as the top 4th country most affected by climate change from 2000 – 2019 (Global Climate Risk Index, 2021).

This report reflects the hard work of a dedicated local and global team, passionate to safeguard our culture for future generations. At its core are local site custodians, community leaders and national heritage professionals from ICOMOS Philippines. That local team is supported by a broader and global initiative called Preserving Legacies.

With support from the National Geographic Society and Manulife, Preserving Legacies empowers communities with the scientific knowledge and technical training to achieve appropriate place and people-based climate adaptation plans to safeguard heritage. The project works with local heritage professionals around the world to provide skills training and support so that they can respond to the climate crisis in a robust and sustainable way.

While climate change is a global problem, its impacts are locally experienced. It is essential that heritage professionals, custodians and stakeholders learn to respond effectively to climate risk and embed climate preparedness in community and site management structures. These actions must be people-centred and respectful of issues, worldviews and knowledge systems of the locality.

A key part of Preserving Legacies is locally-led and community-focused climate risk assessment workshops, which identify key risk areas using a values-based approach. This essential prerequisite for climate adaptation helps to embed science-informed, community-led resilience and avoid maladaptation. The Climate Risk and Resilience at the Rice Terraces of the Philippine Cordilleras risk assessment represents a year's work of community meetings, lectures and workshops. These include innovative local adaptations unique to the Ifugao landscape and its people.

Preserving Legacies has created a global community and support network of heritage professionals engaged in climate action. The project has gathered site custodians from Bangladesh, Cambodia, Columbia, The United States, The Federated States of Micronesia, Fiji, Ireland, the Philippines, Togo and Benin to share experiences with the local community (Fig. 1a and 1b) and learn from each other. This engagement proved to be a rich and rewarding learning experience for all involved, and a valuable learning experience for those leading similar workshops at their own sites. As such, the Rice Terraces of the Philippine Cordilleras risk assessment workshop is a seed that, now planted, will grow and yield fruit globally.

Fig. 1a. Workshop attendees with global partners from Preserving Legacies. (Source: Preserving Legacies Team)

Fig. 1b. Workshop attendees joining the *Bakle* post-harvest thanksgiving festival. (Source: Preserving Legacies Team)

1.2 Climate Risk and Resilience at the Rice Terraces of the Philippine Cordilleras

The Rice Terraces of the Philippine Cordilleras, carved by ancient Ifugao communities, are a marvel of engineering and hydrology that have survived because of a vibrant, living indigenous culture. Known in the vernacular as the Ifugao Rice Terraces, they are more than just a testament to human innovation, they are the lifeblood of the Ifugao community. Its rice fields are central to traditions: communal rice planting, sowing, weeding and harvesting rituals bind villages together in a distinct way of life. The terraces are the heart of the Ifugao as a people and as a distinct culture. In 1995, they were inscribed as a UNESCO world heritage site.

Recently, this cultural landscape and its people have come to a crossroads, with the traditional way of living on one road, and the modern world on the other. Poverty is present in many communities, and some have abandoned their fields to become part of the contemporary world (Fig. 2). The Ifugao now grapple with managing change as they preserve their cultural identity, and embracing the opportunities outside of the terraces.

Fig. 2. An abandoned section of terraced fields reverting back to forest.

While past studies have acknowledged these challenges from many angles, one critical aspect remains largely unexplored: a local values-based impact assessment of climate change. This study seeks to fill that gap by undertaking a comprehensive Community Values-Based Climate Vulnerability Assessment (CVA), an initiative that places the values and perspectives of the local community at its core.

There are escalating impacts of climate change on cultural heritage, and comprehensive CVAs can help. These assessments are essential in informing adaptive management strategies, and are particularly crucial in safeguarding the integrity and resilience of cultural landscapes against threats of a changing climate.

The Ifugao, their terraces and indigenous traditions face mounting pressures from erratic rainfall patterns, increased temperatures, and heightened risks of natural disasters. Its climate-based vulnerability assessment reveals immediate vulnerabilities. But they also reveal that these very weaknesses can also become a rallying point to coalesce the community towards resilience and adaptive capacity.

1.3 Project Vision

The work studies how local values are affected by climate change, and incorporates climate resilience as a fundamental aspect of heritage conservation strategies. In the case of the Ifugao Rice Terraces, it meant integrating indigenous knowledge and traditional adaptive practices into the broader conservation effort.

The output of the Climate Vulnerability Assessment (CVA) presents a broad view of the terraces' susceptibility to climate change impacts (key areas of exposure, sensitivity, and vulnerability). It evaluates the impact of specific climate hazards, such as intensified typhoons, prolonged droughts, and shifting weather patterns, on components such as agriculture, forests, communities, and cultural heritage. By quantifying vulnerability levels, the CVA helps prioritize adaptation and mitigation strategies to enhance the resilience to climate change.

What sets this study apart from existing studies on the Ifugao Rice Terraces is the dual focus on indigenous knowledge and climate science. The study merges traditional wisdom (harnessed from communities) and modern scientific methods (harnessed from a climate scientist) and develops adaptive strategies that are both culturally relevant and scientifically sound. Importantly, it is locally led: the Cordillera project team is composed of Ifugao indigenous peoples, who facilitated data gathering activities with Ifugao stakeholders from each of the five clusters within the UNESCO World Heritage Site.

1.4 Methodology

Values-based approach in assessing the site's climate vulnerability

The process centers on understanding how the community values the site, the associated local knowledge and traditions, and the impact climate change has on them. This approach recognizes that communities have developed unique perspectives and practices over generations which are intimately tied to their culture and environment. In the context of climate vulnerability, community members identify and prioritize which aspects of their cultural, social, and environmental heritage are most at risk from climate change.

It is important to use a community values-based approach at the Ifugao Rice Terraces because it acknowledges that the Rice Terraces are not just a physical entity but a living cultural landscape. It emphasizes the inseparable connection between the cultural values of the community and the sustainability of the terraces in the face of climate change, as explained further in the reasons below:

1. Cultural Sensitivity:
The Rice Terraces hold deep cultural and spiritual significance for the Ifugao people. A community values-based approach ensures that the assessment considers the cultural and spiritual values attached to the terraces, acknowledges and respects the local worldview and ensures that climate adaptation strategies are culturally sensitive, and therefore meaningful and more likely to be implemented by the local community.

2. Indigenous Knowledge and Wisdom:
A community values-based approach leverages the traditional ecological knowledge / indigenous knowledge systems of local communities in order to understand how the terraces were historically managed in response to environmental challenges. This knowledge can inform adaptive strategies that are rooted in the community's historical practices.

3. Community Engagement and Ownership:
Involving the local community in the assessment process fosters a sense of ownership and responsibility. It ensures that the community actively participates in identifying vulnerabilities, proposing solutions, and implementing adaptation measures. This participatory approach is more likely to lead to the successful implementation of climate resilience strategies.

4. Holistic Cultural Heritage Conservation:
The cultural values of the Rice Terraces are as much intangible as tangible; they embody the cultural identity and heritage of the Ifugao people. A values-based approach ensures that climate adaptation measures are designed not only to protect the physical structure but also to preserve the cultural integrity and identity associated with the terraces.

5. Broad Perspective:
By incorporating community values, the assessment gains a broad perspective of the interconnectedness between the terraces, the community, and the extensive cultural landscape. This understanding is essential for crafting effective and culturally relevant climate adaptation strategies.

6. Build Resilience:
A values-based approach recognizes the resilience inherent in the community's historical adaptation practices.This approach ensures that climate resilience is not imposed from outside but is an extension of the community's existing adaptive capacity.

II. Rice Terraces of the Philippine Cordilleras

Chapter II

2.1 Description of the Site

The site is composed of five terrace clusters, spread across various municipalities (Figs. 3 & 4) . The distance between each cluster ranges from 5,000 to 26,000 meters, with a travel duration of 30 minutes to 3 hours.

1. **Nagacada**n in the municipality of Kiangan
2. **Hungduan** municipality covering all nine barangays
3. **Central Mayoyao** in the municipality of Mayoyao
4. **Bangaan** in the municipality of Banaue; and
5. **Batad**, also in the municipality of Banaue.

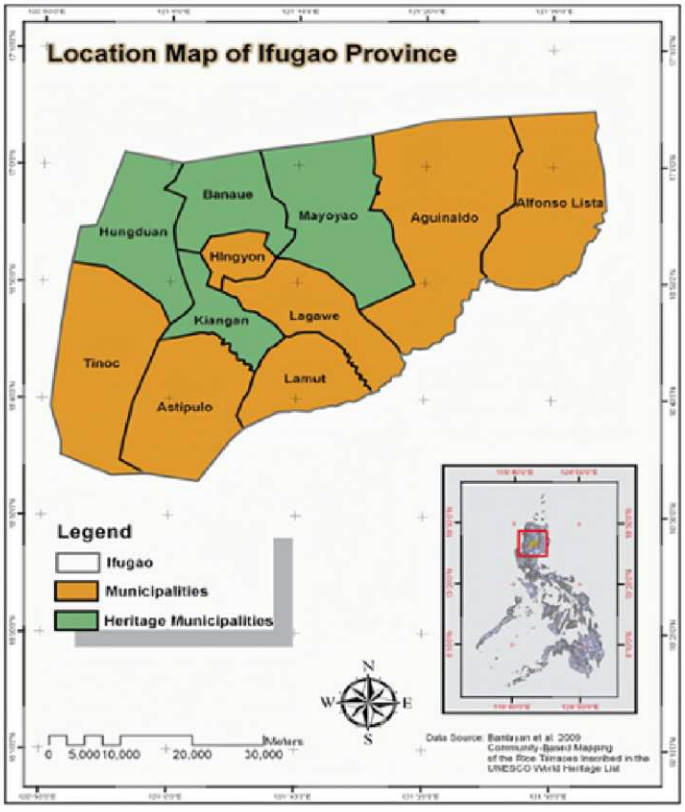


Fig. 3. Location map of Ifugao Province. (Source:Bantayan et al, 2009.)

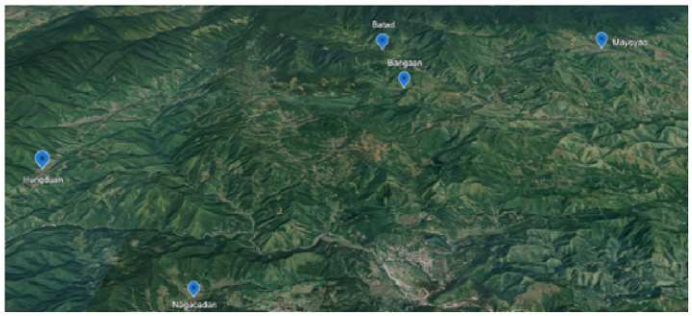


Fig. 4. Google Earth map of municipalities in the five clusters.

Geography

Part of the Philippines' Cordillera Administrative Region in North Central Luzon, Ifugao is a landlocked province bordered by mountains to the north and west, transitioning to hills in the south and east. The terraces are 500 meters above sea level, with the highest elevation reaching 2,523 meters above sea level. The Magat River marks the southeastern boundary, separating the hilly region from lowland provinces.

The climate is temperate, with cold temperatures from November to February and the rainy season lasting from May to February. With a total land area of 251,778 hectares across eleven municipalities, about 81.77 percent of the land has a slope of over 18 degrees, falling under tenurial restrictions as public forest lands, forest reserves, and watershed reservations.

Commonly held belief is that the Ifugao terraces, date back 2,000 years according to Barton (1919) and Beyer (1955). However, recent research in the region, including studies by Acabado (2009; 2010b; 2015) and Acabado et al. (2019), suggests a more recent origin. These studies indicate that the introduction of wet-rice varieties in the northern Philippine highlands occurred after the arrival of the Spanish around 1575 in northern Luzon, challenging the long-held notion of the terraces' antiquity.

Economic Growth

In the 1990s, Ifugao province belonged to the 20 poorest provinces in the Philippines, but has become one of the least poor with recorded significant improvements in Poverty Index (PI) since 2015.

2015 - 42.40% PI (cluster 3; moderate)
2018 - 14.5% PI (cluster 4; moderate to low)
2021 - 8.1% PI (cluster 5; least poor)

The province had 17,100 poor individuals in 2021 as compared to 30,100 poor individuals in 2018. Ifugao graduated from being part of the 20 poorest provinces in the 1990s and making it to the list of least poor clusters in 2021. It now belongs to Cluster 5, or the least poor, according to the latest Philippine Statistics Authority survey.

(https://rssocar.psa.gov.ph/system/files/publication/3rd-Quarter-2022-Quarter_Final.pdf)

2.2 Description of the Indigenous People: The Ifugao

The Ifugaos are a few of the peoples of the Philippines who successfully resisted Spanish colonialism for over 300 years. They occupy a contiguous land mass bordering with other highland peoples and migrant provinces mainly in the eastern and southern borders. Ifugaos are not a homogenous people but with various ethno-linguistic sub-classifications, and representing diverse ethno-linguistic groups including the Ayangan, Tuwali, Kalanguya, Henanga, Yattuka, and Keley-i.

Amidst their unique traditions, each group manifests a rich mix of cultural distinctions and shared values, and strongly identify as Ifugaos. This collective identity, also the name of their province, underscores a cohesive cultural bond that transcends individual practices. Notably, rice terracing stands as a shared tradition across these diverse groups, forming a cultural common ground.

The construction, utilization, and upkeep of the terraces require tight community-based ecological management systems. Intertwined with traditional knowledge based on a harmonious coexistence with the environment, this emerges as defining markers of Ifugao culture that has sustained these communities for generations.

The Indigenous Peoples' Rights Act of the Philippines of 1998 (IPRA) defines indigenous peoples as follows:

> *"Indigenous Cultural Communities/Indigenous Peoples (ICCs/IPs) refer to a group of people or homogenous societies identified by self-ascription and ascription by others, who have continuously lived as organized community on communally bounded and defined territory, and who have, under claims of ownership since time immemorial, occupied, possessed, and utilized such territories, sharing common bonds of language, customs, traditions, and other distinctive cultural traits, or who have, through resistance to political, social, and cultural inroads of colonization, non-indigenous religions, and cultures, became historically differentiated from the majority of Filipinos."*

The IPRA recognizes indigenous peoples as distinct communities with a long history of continuous occupation of specific territories, marked by common cultural traits, languages, customs, and traditions. Their identity is often tied to their historical resistance to external influences, colonization, and efforts to maintain their unique ways of life.

Since the onset of European colonization, there was active resistance from indigenous groups who formerly inhabited the Magat river valley. When the Spanish conquered the lowland provinces of Isabela, Quirino and Nueva Vizcaya indigenous groups moved upland, as they preferred the difficult terrains of the Cordillera to living under colonial subjugation.

This uphill movement caused a significant increase in demography which led to the massive expansion of terraced agricultural fields from the late 1500s onwards.

2.3 The Rice Terraces of The Philippine Cordilleras as a Globally Significant Heritage Site

The Rice Terraces of the Philippine Cordilleras gained official recognition as a National Cultural Treasure in 1976, one of the highest cultural designations of the Republic of the Philippines. Subsequently, in 1995, UNESCO inscribed it as a World Heritage Site, acknowledging them as an organically evolved cultural landscape. Further emphasizing their global importance, in 2001, the United National Food and Agriculture Organization (UNFAO) designated them as Globally Important Agricultural Heritage Systems (GIAHS).

While various provinces within the Cordillera Administrative Region in the northern Philippines boast their own terraces, the quintessential representation of this heritage lies within the Province of Ifugao. This region hosts five distinguished clusters that embody the essence of the property

.

In 2001, the Hudhud Chants of the Ifugao was declared as one of the 11 Masterpieces of the Oral and Intangible Heritage of Humanity. It was formally inscribed as a UNESCO Intangible Cultural Heritage in 2008. The Hudhud chants are an integral intangible component of the rice terraces and its related rituals (Fig. 5).

In 2013, the official Intangible Heritage Book of the Philippines was published, and 13 of its elements were from Ifugao.

In 2014, the Philippines joined other Asian nations in submission of the "Tug of war" rituals and games — a multinational Intangible Cultural Heritage shared by Vietnam, Cambodia, and the Philippines. In 2015, the Punnuk of Hapao, Hungduan (Fig. 6) was declared by UNESCO as an Intangible Cultural Heritage.

Fig. 5. Village elders performing *Hudhud* chants during the *Bakle*, a post-harvest thanksgiving ritual. (Source: Tina Paterno (2023).

Fig. 6. *Punnuk*, tug of war games among members of three communities in the Hapao River.

2.4 Outstanding Universal Value (OUV) of the Rice Terraces and their Susceptibility to Climate Change

The Rice Terraces of the Philippine Cordilleras is listed as a UNESCO World Heritage site according to three criteria as provided by the Operational Guidelines of the World Heritage Committee. To wit:

1. Criterion (iii): To bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or has disappeared.

(Cultural Tradition and Diversity)
The Rice Terraces bear unique testimony to the Ifugao people's cultural tradition of sustainable agricultural practices and the harmonious interaction between human communities and their environment over more than two millennia.

.2. Criterion (iv): To be an outstanding example of a type of building, architectural or technological ensemble, or landscape which illustrates a significant stage in human history.

(Exceptional Human Creative Genius)
The terraces represent an outstanding example of human creative genius in engineering and agriculture. The site demonstrates the ability of the Ifugao people to adapt to challenging geographical conditions through innovative and sustainable techniques.

3. Criterion (v): To be an outstanding example of a traditional human settlement, land use, or sea use which is representative of a culture (or cultures), or human interaction with the environment, especially when it has become vulnerable under the impact of irreversible change.

(Cultural Landscape)
The Rice Terraces serve as an outstanding example of a traditional human settlement and land use. The landscape reflects a cultural tradition of rice cultivation that has persisted for generations, showcasing the harmony between the Ifugao community and their environment.

Shaped by generations of sustainable farming practices, this landscape now faces unprecedented shifts in temperature, precipitation patterns, and extreme weather events, among others. The complex balance that sustains rice cultivation in the terraces faces disruption that will impact the community's traditional agricultural methods, water management systems, and rice rituals, thereby also directly affecting the OUV.

The vulnerability of the terraced fields to landslides and soil erosion is heightened by climate-related factors. This jeopardizes the structural integrity of the terraces and poses a direct threat to their OUVs. An additional risk to sustainability of the terraces is the out-migration of members of terraces communities, and younger generations losing interest in keeping traditions and indigenous knowledge practices alive. The potential loss of traditional rice varieties further compounds the challenges, as these elements are integral to the cultural and ecological richness encapsulated by the OUVs. Mitigating this requires a holistic strategy that

Fig. 7. Dry, cracked earth during a drought in Batad, April, 2024.

uses traditional ecological knowledge in adaptive practices, fosters resilient agricultural techniques, and empowers local communities through community-led conservation initiatives. Engaging with the Ifugao people is critical in developing effective adaptation measures that respect the cultural values inherent in the OUVs. This involves not only preserving the physical structures but also safeguarding the collective wisdom, rituals, and communal practices linked to rice cultivation. By addressing the complex interplay between cultural practices, ecological dynamics, and the impacts of climate change, the conservation and sustainable management of the Rice Terraces can evolve to ensure the resilience and longevity of this iconic landscape for future generations. In climate vulnerability assessments, understanding the impact of climate change to the Outstanding Universal Value (OUV) is a comprehensive process. In this process the site's OUV attributes are examined for their susceptibility, sensitivity and exposure to future climate hazards, such as temperature variations or extreme weather events. Engaging with local communities is integral to this process, because OUV is aligned with local perspectives, traditional knowledge, and community values. This enables a broad perspective on climate vulnerabilities. Additionally, the assessment draws insights from how the site adapted to extreme weather conditions historically, and evaluates whether the adaptive strategies historically employed are still relevant or need enhancement.

The OUV not only informs management strategies by guiding the development of adaptation measures but also plays a pivotal role in advocating for conservation efforts. Recognizing the global significance of the site through the OUV strengthens advocacy for climate resilience, emphasizing potential impacts on outstanding features. Furthermore, the OUV serves as a valuable tool for reporting climate vulnerability to international bodies, contributing to global awareness and potentially attracting support for conservation initiatives. In essence, the integration of OUV in Climate Vulnerability Indexes ensure that conservation efforts are tailored to address the unique vulnerabilities of features contributing to the site's Outstanding Universal Value. Vulnerability assessments ensures that conservation efforts are tailored to address the unique vulnerabilities associated with the features contributing to the site's Outstanding Universal Value.

2.5 Aligning OUVs and Local Values

Locally identified values enable a perspective of the terraces' significance to local or indigenous communities, while Outstanding Universal Values (OUVs) encompass the exceptional qualities that justify a site's inscription on the World Heritage List, but do not always represent local values. OUVs serve as a globally validated language among diverse stakeholders, such as government agencies, conservation organizations, and the academic community. While local values reflect the needs and aspirations of indigenous communities, OUVs reflect the global perspective of its value. Thus, integrating both local values and OUVs in the CVI assessment ensures a balanced approach that respects the cultural integrity of indigenous communities while upholding global conservation principles.

The development of adaptive strategies involves integrating both the OUVs and local values. This approach ensures that adaptation measures are rooted in the cultural identity of the community, thereby preserving not only the physical structures but also the rituals and traditions that contribute to both the OUVs and the community's values. Additionally, this enables a fuller encapsulation of site's significance, so that conservation efforts resonate with both international conservation goals and the priorities of local stakeholders.

Outstanding Universal Values (OUVs)

- The Ifugao Rice Terraces are recognized for their remarkable engineering and hydrological systems, showcasing the ingenuity of ancient Ifugao communities.
- Their rich cultural significance is evident in the intricate rituals and ceremonies associated with rice cultivation, reflecting the deep spiritual connection between the Ifugao people and their ancestral lands.
- The terraces serve as a living testament to the sustainable land use practices of indigenous communities, illustrating their harmonious relationship with the environment over centuries.

Local Values

- Indigenous communities view the terraces as the embodiment of their cultural identity and heritage, representing the collective wisdom and resilience of past generations.
- The terraces are central to the socio-economic fabric of Ifugao society, providing sustenance, livelihoods, and a sense of community cohesion.
- Local rituals and ceremonies, such as the *Hudhud* chants and *Punnuk* post-harvest rituals, are deeply intertwined with the agricultural calendar, reinforcing the spiritual and social significance of the terraces.

Commonalities

- The Ifugao Rice Terraces' significance as a cultural landscape, emphasizing their role as a tangible and intangible heritage of universal value.
- The recognition of the terraces' engineering feats and cultural traditions aligns with both global conservation standards and the aspirations of indigenous communities.

Fig. 8. OUVs, Loca Values and Commonalities.

III. Community Engagement

Chapter III

3.1. Planning and Organizing Focus Group Discussions (FGDs) within the Ifugao Community

Fig. 9. Batad World Heritage Cluster. (Source: Emil Marañon, 2016)

Each of the five clusters of the World Heritage Site has distinct and diverse cultural nuances. Recognising these differences, and to encourage freer discussions, separate Focus Group Discussions (FGDs) were conducted for each of the five clusters.

This effort required navigating through government bureaucracy and community hierarchies at different levels. The five clusters are located in four separate municipalities, each requiring local government permission. Before obtaining these permissions, consultation with the National Commission on Indigenous Peoples (NCIP) was necessary to determine if the Free and Prior Informed Consent process (FPIC) was required.

This step is essential for legal and ethical project implementation, considering the area's classification as an indigenous peoples' ancestral domain under the Indigenous Peoples Rights Act (IPRA).

A letter of inquiry was sent to the regional office of the commission, following advice from the provincial office. The regional office clarified that the FPIC process does not apply but recommended participation in the community process to ensure cultural sensitivity during the exercise.

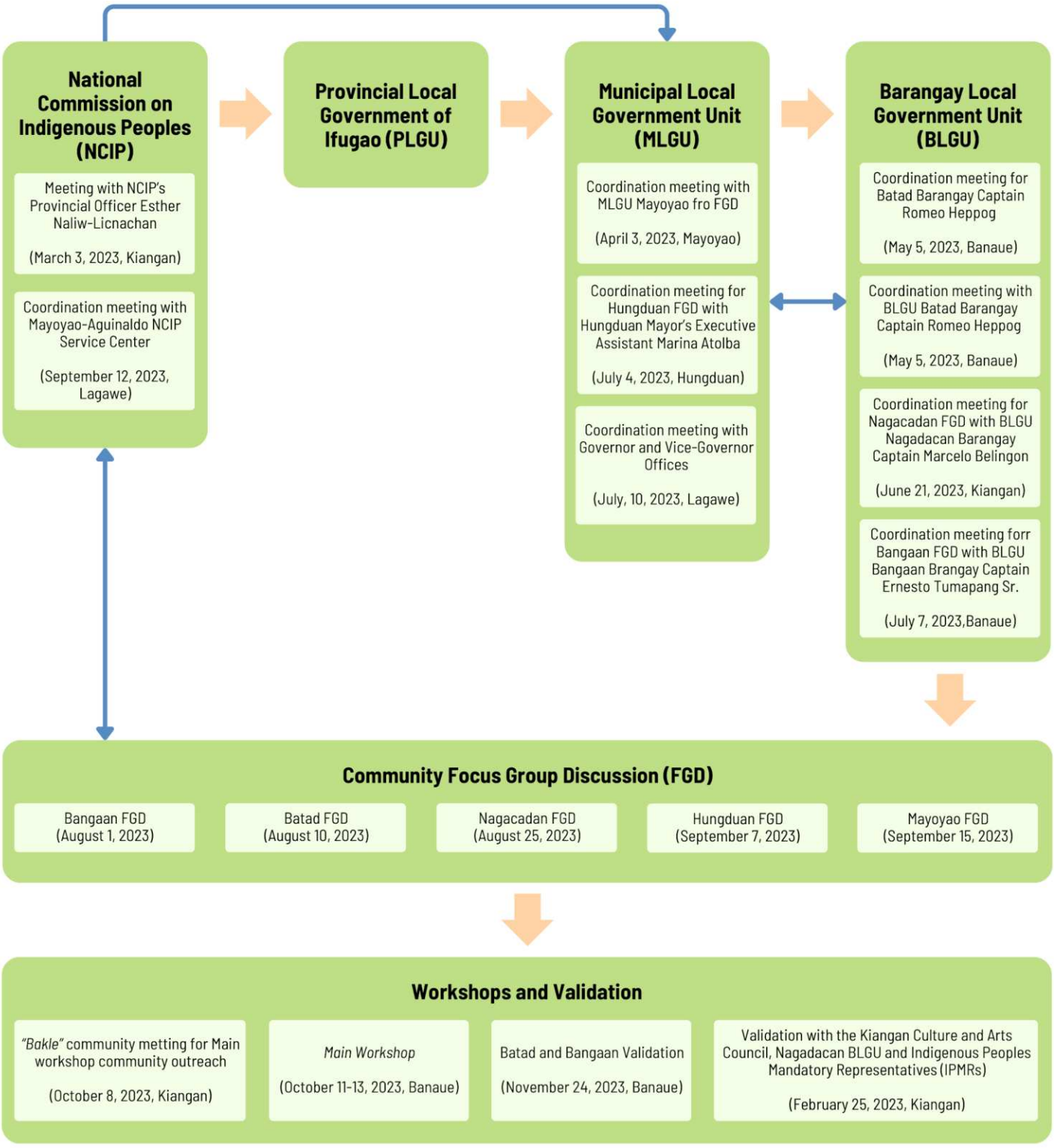


Fig. 10. Processes involved in community engagement.

3.2 The Engagement Process

The process begins with introducing the project to community leaders and government agencies responsible for climate action and environmental management. This initial step involves presenting the project with the intent to gain their support, collaboration, and input. By fostering partnerships with government agencies, the project gains access to valuable data, resources, and expertise that enhance the quality and credibility of the assessment. Moreover, engaging local leaders and government agencies from the onset (Fig. 11) helps to align the CVA with existing local and regional policies, plans, and initiatives related to climate resilience and adaptation.

Fig. 11. Work flow illustrating frequent community engagement throughout the process.

3.3 The Consent Process

The Rice Terraces of the Philippine Cordilleras are inhabited by the Ifugao, indigenous people, living on ancestral domains. In the context of conducting a Climate Vulnerability Index (CVI) here, gaining consent is paramount and this process must be approached with utmost respect for indigenous rights and customary practices. It was, therefore, imperative to engage in comprehensive consultations with key stakeholders, including the NCIP, Provincial Municipal Local Governments, Barangay Local Governments, and Community Civil Society Organizations. These consultations serve to seek the FPIC of the indigenous communities residing within the ancestral domain. Through these consultations, the project team could establish meaningful partnerships, build trust, and ensure that the voices and concerns of the indigenous communities are heard and incorporated into the project design and implementation. Additionally, engaging with the NCIP and relevant government authorities helps to navigate legal and regulatory frameworks governing indigenous lands and ensures compliance with established protocols for conducting research and assessments within these territories. By prioritizing the consent process and fostering inclusive participation, the project can uphold indigenous rights, promote community ownership, and generate outcomes that are culturally sensitive, socially just, and environmentally sustainable.

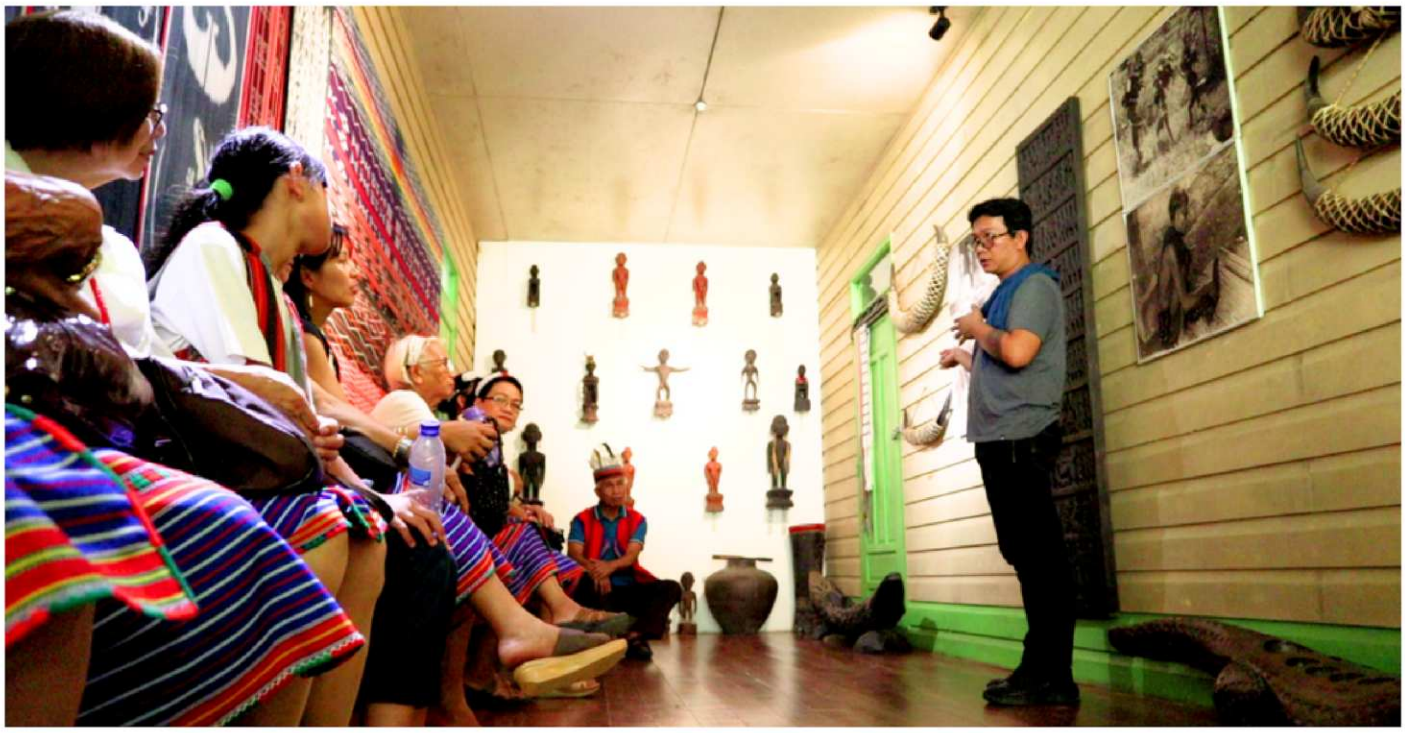


Fig. 12. Meeting with Mayoyao representatives.

3.3 Community Workshops

Individual community workshops were conducted in Batad and Bangaan in Banaue, Hungduan, Mayoyao and Nagacadan in Kiangan, representing the five clusters of the Rice Terraces of the Philippine Cordilleras. Participants were engaged through facilitated focused group discussions within members of the same community to encourage candid conversations. These workshops served as vital platforms in identifying the terraces' value to the community, and understanding their exposure, vulnerability, and adaptation strategies in the face of climate change. Through these workshops, community participants, mostly farmers, drew upon their intimate knowledge of the terraces, accumulated through generations of stewardship, to articulate the cultural, ecological, and socioeconomic significance of this UNESCO World Heritage Site to them. Through dialogue and insights sharing, community members collectively identified key climate stressors and vulnerabilities affecting the terraces, as well as traditional adaptive practices that have sustained them over time.

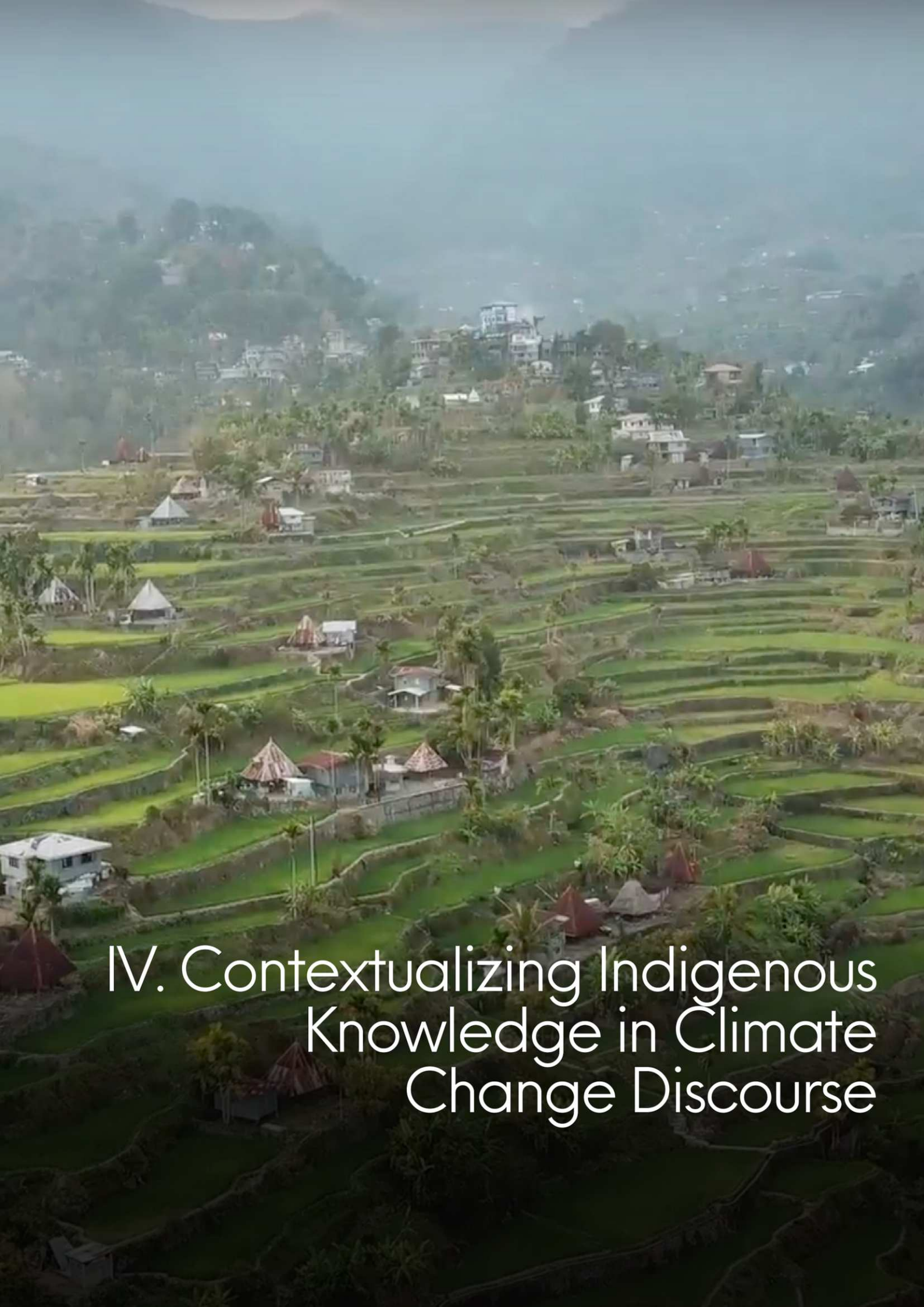
Finally, a plenary workshop convened diverse stakeholders ranging from farmers who participated in previous workshops, to representatives of local government and national agencies, and observer custodians of other world heritage sites In this forum, stakeholders shared perspectives, exchanged expertise, and co-created strategies for enhancing the resilience of the terraces to climate change impacts. Through inclusive and participatory processes, these workshops empower communities to take ownership of climate adaptation efforts and foster partnerships that bridge local knowledge with scientific expertise and policy frameworks.

3.4 Report Generation

Following all workshops, the project team drafted a comprehensive report in close coordination with relevant community leaders. This report synthesizes the insights, findings, and recommendations generated in the workshops, and incorporates both scientific data and indigenous knowledge perspectives. The data herein is derived from this collaborative process, which can inform future decision-making, guide policy development, and mobilize support for climate resilience efforts within the local community and beyond.

3.5. Community Presentation and Validation

Finally, the report was presented to community leaders for validation, feedback, and ensure that it accurately represents the realities on the ground. This crucial step in the Climate Vulnerability Index (CVI) process strengthens the legitimacy of the findings and inspires a sense of ownership by the community. By engaging community leaders in the validation process, the report becomes more than just a technical document; it becomes a reflection of the collective knowledge, concerns, and aspirations of the community itself. This reinforces trust and partnership between the project team and the community, and strengthens the credibility of the report. Ultimately, by validating the report, community leaders affirm their commitment to addressing climate vulnerabilities and demonstrate their active role in shaping the future resilience of their environment and livelihoods.



IV. Contextualizing Indigenous Knowledge in Climate Change Discourse

Chapter IV

The indigenous knowledge systems and practices of the Ifugao people are a testament to the intricacies of sustainable natural resources management. At the center of the Ifugao's cultural heritage is a wealth of wisdom cultivated over generations, most notably showcased in the Ifugao Rice Terraces. These terraces stand as a testament to the Ifugao people's ingenuity and employ agricultural practices that harmonize ecological sustainability with agricultural productivity.

This indigenous knowledge shows the Ifugao's holistic understanding of the delicate ecological balance of soil and water conservation within their highland environment. This not only applies to the terraces, but also forests- traditional techniques of forest management, which are dedicated to the stewardship of woodlots and communal forests. Crucially and for purposes of this report, to comprehend the full significance of Ifugao traditional knowledge, it is imperative to contextualize it within the discourse on climate change. In doing so, we uncover sustainable practices and a living example of how indigenous wisdom can aid in navigating climate change challenges. Ifugao traditional knowledge thus becomes not just a historical legacy but a guidepost for conversations on environmental sustainability and climate resilience.

4.1 Ifugao Indigenous Knowledge Systems and Practices

4.1.1 Intergenerational Responsibility - an Ifugao Philosophy

Among the Ifugao, the concept of intergenerational responsibility transcends mere familial ties; it is rooted in the connection between the land and the Ifugao people. The age-old saying, "You plant a tree not for yourself but for your children or grandchildren," captures the sense of stewardship that guides the Ifugao community in their relationship with the environment. This philosophy extends beyond individual actions to communal endeavors, particularly in the collective ownership of forests, where the need for community accountability in the management of forest resources is paramount.

Forests, integral to the maintenance and sustainability of the Ifugao rice terraces, embody Ifugao identity and culture, and represent centuries of harmonious coexistence between the community and its natural surroundings. The rice terraces are a testament to the Ifugao people's deep understanding of the land, water, and complex ecosystems.

In Ifugao, intergenerational responsibility lies the recognition that the actions taken today shape the world inherited by future generations. Planting a tree is an investment not only in ecological balance but also in the preservation of cultural heritage. The communal ownership of forests, managed with a long-term perspective, aligns with the ethos of maintaining a delicate equilibrium between human needs and environmental sustainability. Similar to this indigenous concept, in the case of Oposa vs. Factoran (G.R. No.101083), the Philippine Supreme Court recognized the rights of a group of minors to sue the Secretary of the Department of Environment and Natural Resources (DENR) to prevent him from further issuing logging licenses "for the protection of their generation and generations yet unborn." Justice Hilario Davide enunciated thus, "In a broader sense, this petition bears upon the right of Filipinos to a balanced and healthful ecology which the petitioners dramatically associate with the twin concepts of "intergenerational responsibility" and "intergenerational justice."

In the face of escalating climate challenges, the Ifugao people's inter-generational responsibility takes on new significance. The meticulous water management systems, sustainable agricultural practices, and communal forest management, all deeply embedded in indigenous knowledge, play crucial roles in mitigating the impacts of climate change on the landscape and its cultural treasures.

There is an urgent need to pass down this knowledge, particularly in natural resources management, to younger generations. Indigenous knowledge is declining among the younger Ifugao generations, due to various factors, including the influence of modern education systems that prioritize Western-centric curriculum over traditional practices. Additionally, globalization and the allure of modern lifestyles have led many young Ifugaos to pursue opportunities outside their ancestral lands, distancing themselves from the cultural teachings of their elders. While the desire to embrace modernity is understandable and inevitable, it poses a challenge to the transmission of indigenous knowledge, risking the loss of valuable insights into sustainable land management, traditional agricultural techniques, and cultural heritage that have sustained the Ifugao terraces for generations. Adapting to the evolving climate is not just an immediate need but a commitment to securing a resilient future for the generations yet to come.

Within the cultural ethos of the Ifugao, an enduring understanding transcends temporal boundaries, establishing a symbiotic relationship between communities and the environment. This cultural tenet underscores a perspective that spans generations past, present and future, compelling each cohort to assume stewardship of the planet for those coming after.

As contemporary climate challenges escalate, the Ifugao paradigm emerges as an exemplar, advocating for participatory decision-making mechanisms and the preservation of traditional knowledge. This indigenous ethos can be strategically incorporated into climate change mitigation strategies through educational initiatives, community involvement, and policy frameworks. By integrating this principle into the discourse and initiatives surrounding climate change, societies may progress toward heightened resilience, sustainable practices, and a collective dedication to the safeguarding of our shared cultural and environmental legacy.

4.1.2 Traditional Resource Management and Agricultural Methods Employed in the Terraces

LAND USE

The Ifugao land use system integrates diverse components, including terraced rice fields, managed forests, swidden farms, and traditional settlements, to construct a cohesive cultural landscape. The Ifugao forest assumes paramount importance in this ecosystem, as it not only enriches the soil with organic nutrients essential for rice cultivation but also serves as a sustainable reservoir of construction materials and handicraft resources vital for local livelihoods. Swidden agriculture functions as a supplementary food source for the village populace and assumes primary importance in the event of crop failure within the terraced fields. At the heart of this landscape lie the rice terraces, a testament to generations of indigenous knowledge and ingenuity. These terraces, meticulously constructed along steep mountain contours, operate not solely as productive arable lands but also as intricate hydrological systems. Utilizing a network of stone and earth-walled irrigation channels, known as "alak," water is efficiently harnessed from mountain springs and streams, facilitating controlled distribution throughout the terraces to optimize rice cultivation while mitigating soil erosion. Moreover, the terraces serve as natural water catchments, regulating water flow to mitigate flood and drought risks, concurrently fostering biodiversity by providing habitats for a diverse array of flora and fauna. This nuanced management of water resources within the terraced landscape exemplifies the environmental literacy of the Ifugao people, emphasizing their steadfast commitment to sustainable land use practices.

a. *Muyung* (Forest Management System)

The Ifugaos maintain two distinct types of forests, each distinguished by its stewardship and utility. The first category, *pinugo* or *muyong* proper, or family-owned forests, is intricately linked to the familial hierarchy and inherited through primogeniture. Serving as an accessory to the main family rice fields, these forests carry a unique responsibility assigned to the firstborn. The eldest child is entrusted with the guardianship of the forest, with the duty to share its resources judiciously among family members when the need arises. This familial pairing of forests and rice fields is a practical inheritance strategy and resonates with the Ifugao's understanding of the intrinsic interconnectedness between these two vital components of their livelihood.

The second type of Ifugao forest is the *inalahan*, located above the terraces, a distinctive category known as communal forests, owned collectively by the community itself. These communal forests differ markedly from public forests, as their ownership is exclusive to the community and not open to external entities. Governed by customary law, community members are granted access to the *inalahan* for specific activities such as gathering forest products, engaging in hunting, and ensuring the preservation of its rich biodiversity. The customary laws that regulate the communal forest emphasize a sense of collective responsibility and sustainability. Unlike public forests where usage might lack a sense of communal stewardship, the Ifugao approach emphasizes the balance between individual needs and the shared well-being of the entire village. There is a clear ethos of restraint *(kolokla/konoknong)*, with a prohibition against gathering more than what is necessary, ensuring that one's activities do not compromise the resources needed by other members of the village. This custom reflects a deep-seated understanding of ecological interdependence and the necessity for responsible resource management within the community. Under Ifugao customary law, there are no “public forests” as defined by Philippine forestry laws.

Known reverently as *"tudung di payo"* or the shield of the terraces, these forests play a role in shielding the rice fields below from soil erosion and excess water runoff. Moreover, the forest litter acts as a natural replenisher, infusing the terraces' ecology with essential soil nutrients critical for sustained agricultural productivity. In this symbiotic relationship, the Ifugao people demonstrate a holistic approach to land management, recognizing the indispensable synergy between their ancestral forests and the terraced landscapes that define their cultural identity.

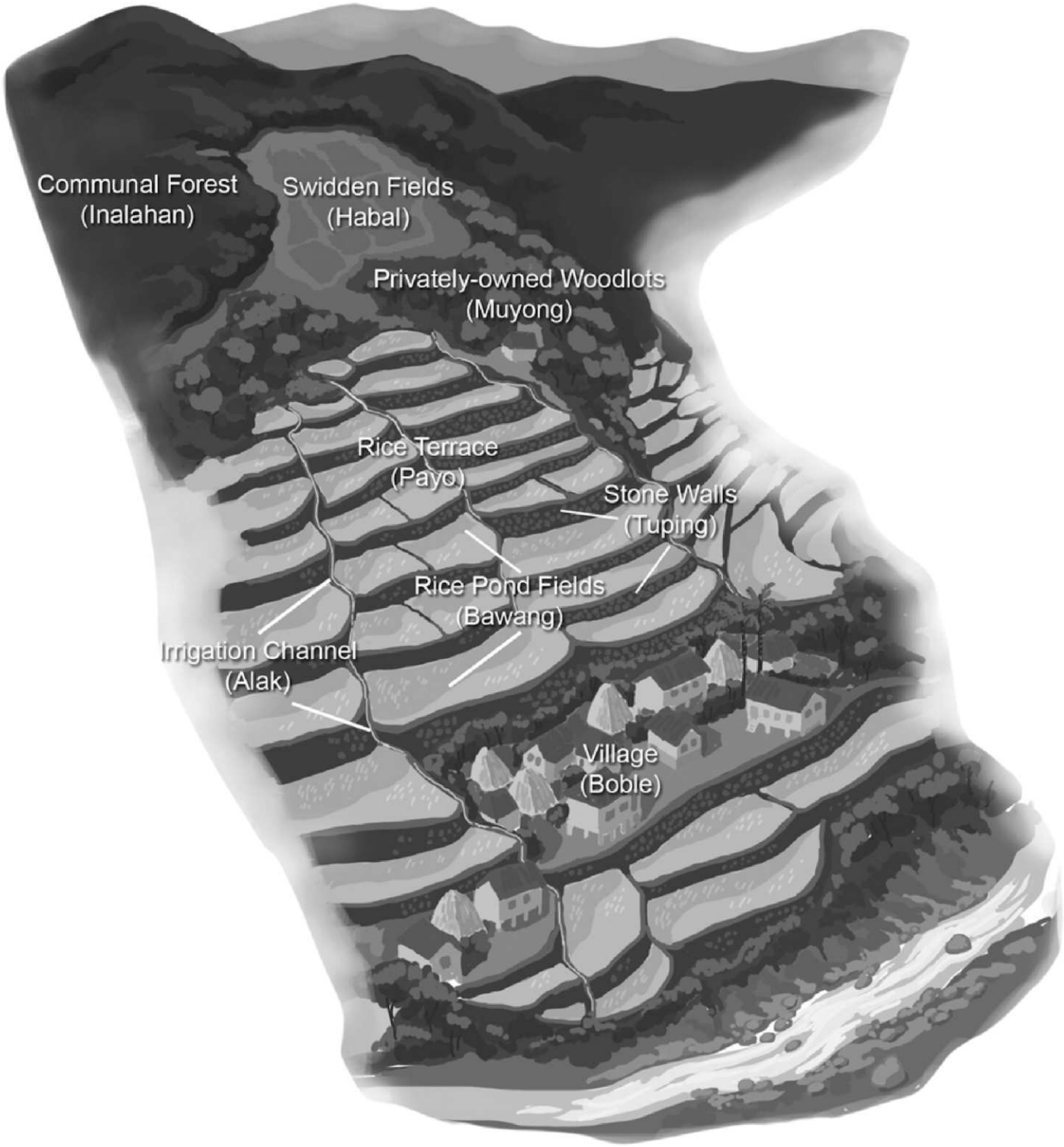


Fig. 13. The Ifugao agro-ecological landscape. (Adopted from Acabado & Martin, 2024)

Fig. 14. Managed forests surround the cluster of terraces in Mayoyao. (Source: SITMo 2022)

b. Terrace Agriculture

The Ifugao Rice Terraces have existed for at least 500 years, and have withstood colonialism, religious conversion and modernization, and is a living testament to the enduring wisdom and adaptive practices of the Ifugao people across changing times and climates. In the face of a changing climate, the terraces persist as an engineering marvel, a reservoir of ecological knowledge honed through generations of experience, and remain a resilient model of sustainable adaptation.

The design of the terraces arrests erosion, preserves water and soil nutrients and generally responds to the challenges of erratic weather patterns and environmental shifts. Yet, this age-old agricultural system is not impervious to climate change. The continuity of the Ifugao Rice Terraces hinges on how the younger generations and governmental policies, embrace and leverage the indigenous knowledge systems. As custodians of this ecological heritage, their choices will determine whether these terraces continue to thrive as a living legacy or succumb to the pressures of a rapidly changing world.

The Ifugao Rice Terraces, a remarkable agroecosystem, operates as a self-sustaining conservation system. The terraces establish a vital connection with the surrounding forest, and function in a holistic environment. Acting as both reservoirs and purifiers, the rice paddies efficiently manage water, prevent erosion and maintain soil health. The strategic bench terracing technique not only provides stable platforms for agriculture but also safeguards against mountain slope instability. The agricultural practices, aligned with the natural environment's cycles, demonstrate a thoughtful balance, ensuring sustainability. Moreover, the Ifugao people's beliefs and practices are integrated into the cultivation of traditional rice, underscoring a deep-rooted relationship between cultural traditions and ecological preservation.

Fig. 15. Paddies must always be fully pooled with water to grow rice and maintain soil plasticity. They act as reservoirs and purifiers, retain soil nutrients and stabilize slopes.

4.1.3 Indigenous Belief Systems and Rituals Associated with Rice Terraces Management

The belief system of the Ifugao is divided into rituals for rice and rituals for persons. Here, we discuss in brief the rituals for rice in association with how they perceive their natural environment and in the context of climate change.

The Ifugao agricultural calendar is divided into four seasons:

- ***Ti-algo*** (the season of the sun)
- ***Ahi-ani*** (the season of harvest)
- ***Lawang*** (the season of work)
- ***Kiwang*** (no translation)

The four seasons are divided into twelve months of 28 days each, each month describing the dominant natural phenomena that occurs during the period.

- **January** – *Dattokna*
- **February** – *Litongna* (cracking sound of snapping twigs, when leaves of trees start shedding)
- **March** – *Luyana* (from *loyo*, withering trees)
- **April** – *Upokna* (from the word literally meaning the powdery chaff of rice; dusty air due to the summer sun)
- **May** – *Lodona/Iodangna* ("redhot iron", peak of summer)
- **June** – *Bakkakona* (ripening of the grains of the *bako* weeds *(Andropogon halepenensis)*
- **July** - *Kitkitina* (the time of rain)
- **August** – *Panabana* (when the nutrients of the fields are getting replenished by decaying mulch and grasses)
- **September** - *Kuhyabna* (start of the cold season)
- **October**- *Adawena* (blooming of the *Adawe* tree)
- **November** – *Kilingna* (arrival of the kiling migratory birds)
- **December**- *Kamaduyungna* ("when nights are biting cold")

The observant Ifugao farmer interprets the subtle cues nature provides, ranging from temperature variations patterns of bird migration, shifts in weather, the life cycles of specific plants, the seasonal shedding of leaves, to alterations in the earth's texture. These nuanced indicators are a natural compass, guiding the farmer to discern optimal times for planting various crops. By keenly attuning to the environment's ever-changing dynamics, the Ifugao farmer harmonizes ancient wisdom with the current ebb and flow of nature to ensure timely cultivation for the best possible yield.

The nuanced integration of traditional agricultural practices and spiritual beliefs among the Ifugao people manifests the ecological consciousness of their worldview. Beyond the pragmatic considerations in the management of their rice terraces, the spiritual dimension derived from these experiences underscores the holistic nature of the Ifugao's relationship with their environment.

The Ifugao cosmology features a diverse pantheon of deities and supernatural entities, which serves as a conceptual framework through which they interpret and engage with the natural world. These metaphysical entities, associated with natural elements and natural phenomena, assume not only custodial roles but also active participation in the choreography of agricultural life. The deification of elemental forces such as rain, wind, and sun reflect a nuanced acknowledgment of the functions they play in crop cultivation and the overall vitality of the communal landscape.

- The Ifugao's nuanced interpretation of the natural world is evidenced in the complex linguistic typology of intensity of wind or types of rain
- A gentle drizzle *(hipuk)*
- Gentler than a drizzle *(hamyuk)*
- Regular rain *(udan)*
- Non-stop rain *(lomlom)*
- Typhoon *(puwok)*
- Rain that occurs simultaneously with sunlight *(bayuhibi)*

For most of the modern world, the environment is a mere backdrop to our lives. In the Ifugao psychological landscape, the environment is a dynamic and sacred entity that nurtures a sense of responsibility and stewardship towards the land. The ceremonial observances of rituals, sacrificial acts, and prayers also express the world view that human welfare is intricately entwined with the health and equilibrium of the natural environment. Their spiritual practices recognize this reciprocal relationship: the environment provides sustenance, and, in return, the Ifugao rituals honor and safeguard the ecological equilibrium.

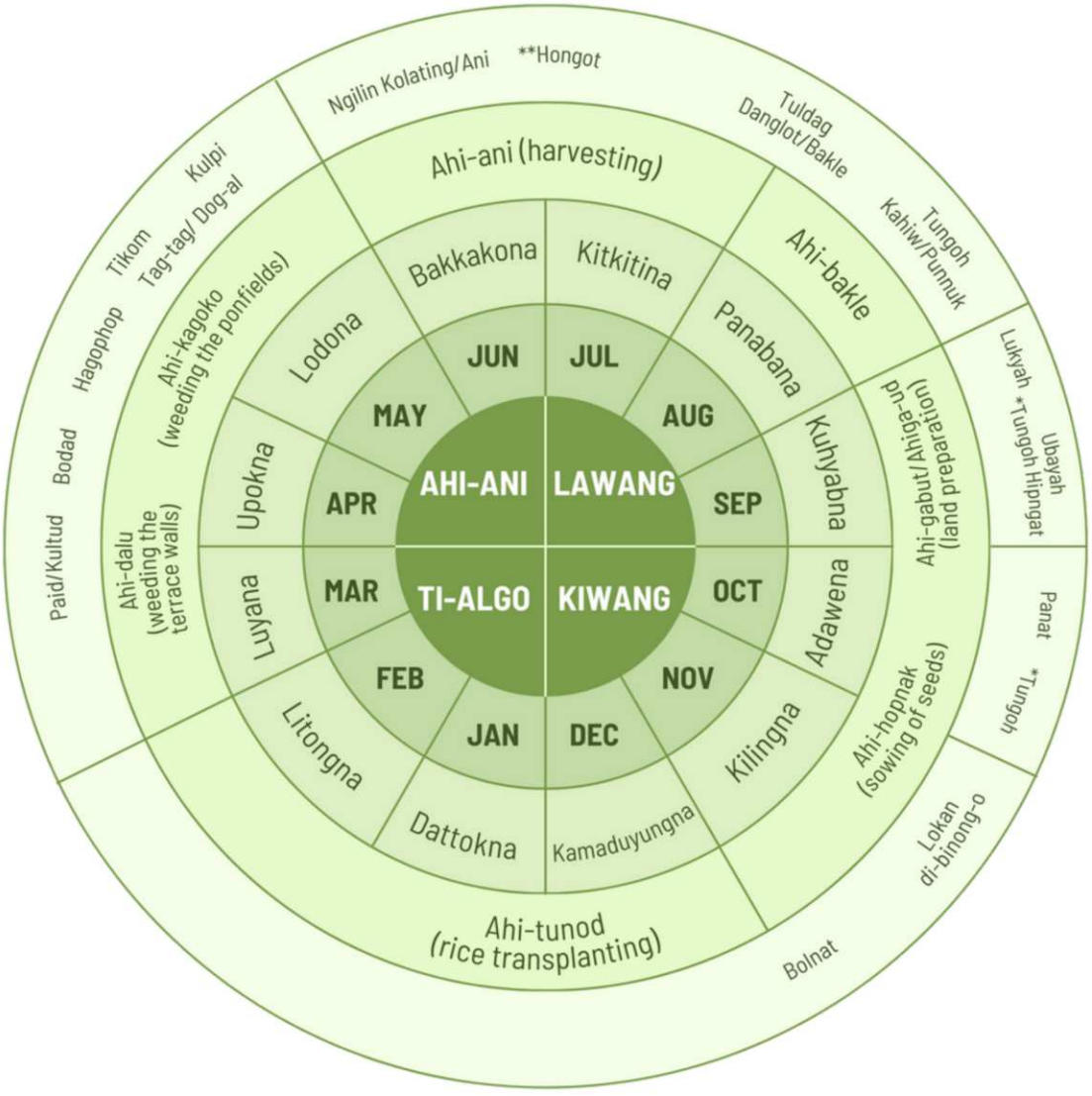
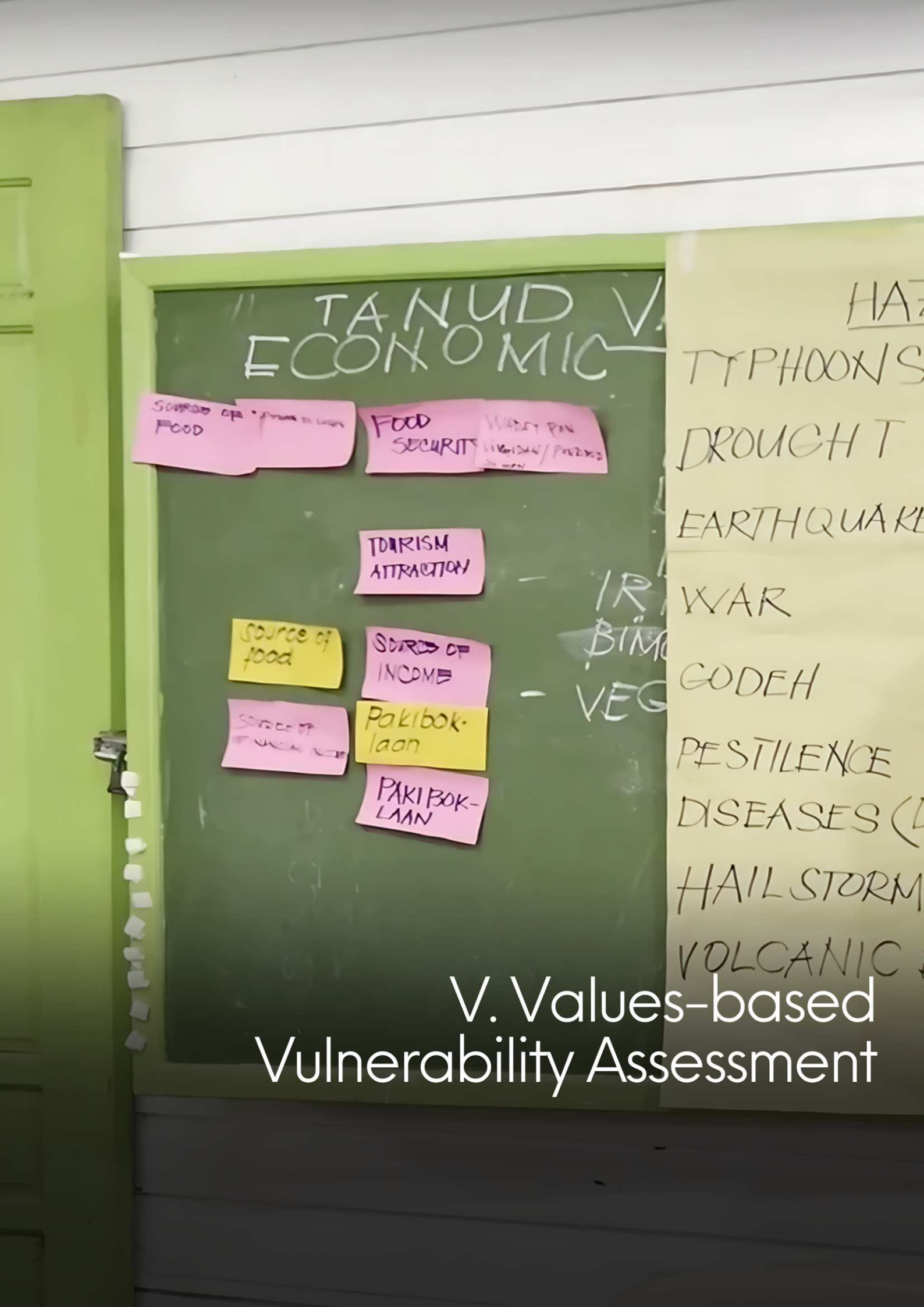


Fig. 16. Traditional agricultural calendar. (Source: SITMo, 2009)



V. Values-based Vulnerability Assessment

Chapter V

Overall, the goal of a values mapping workshop is to facilitate meaningful dialogue, consensus-building, and reflection among participants. This leads to a clearer understanding of shared values and their implications for action in the context of climate change and rice terraces.

See Annex 4 for in-depth description of values.

5.1. Mapping Key Cultural and Environmental Community Values Associated with the Ifugao Rice Terraces

The FGDs started off with the basic question of how the participants perceive the rice terraces and why they are valued . In the diagram below (Fig. 17), participants listed on meta cards words and phrases that they associate with the rice terraces in the context of significance and value. The intent of this question was to understand and prioritize the important values.

Discussions that followed parsed through reasons they are important to participants, and delved deeper into the underlying beliefs, principles, and emotions associated with each value. This process helps clarify and contextualise the values to ensure they are accurately represented.

Lastly, participants were asked to prioritize the most salient values that they felt should guide decision-making and behavior. Four key values emerged, with the rest of the values being extensions or sub-categories (Fig. 18).

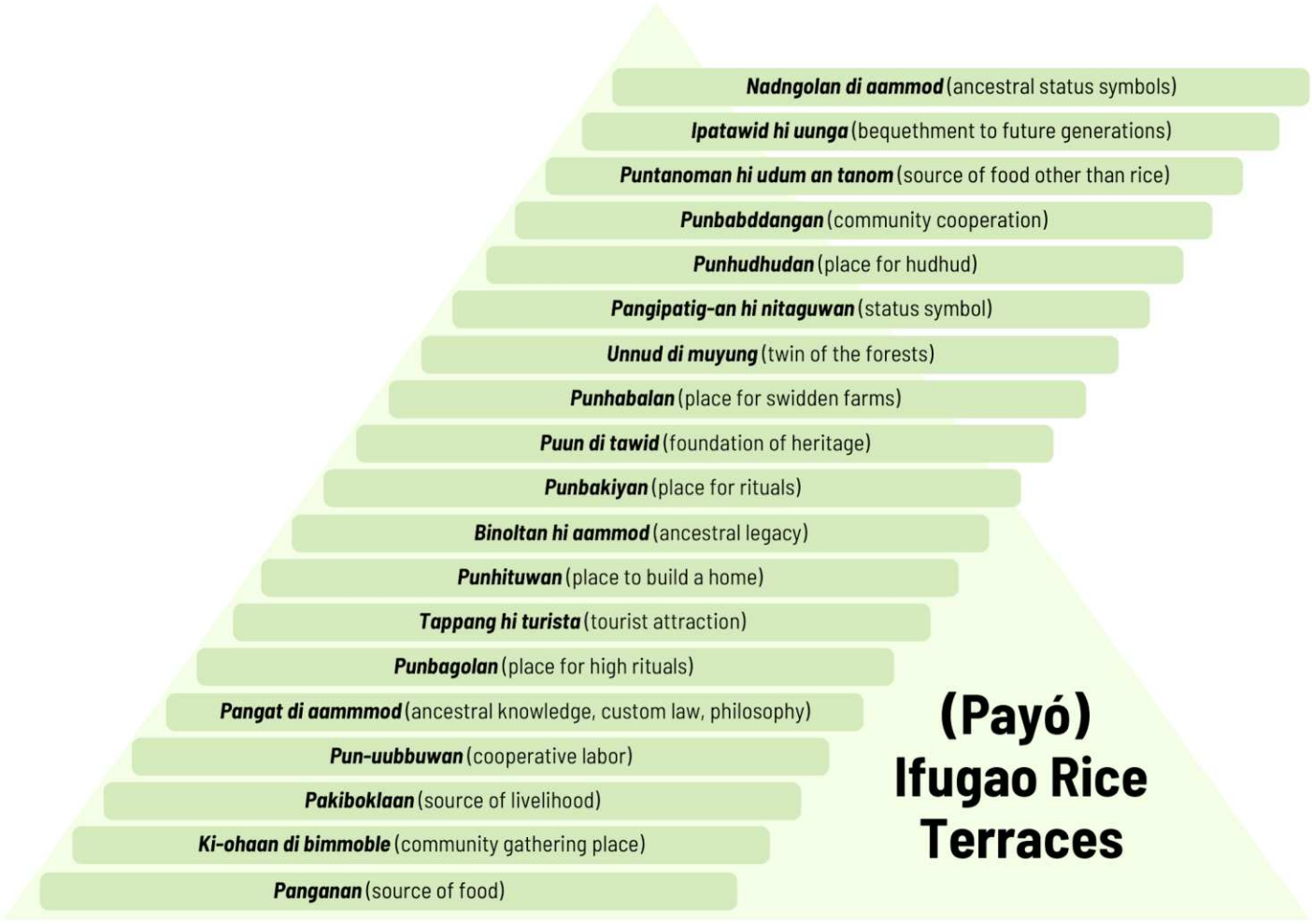


Fig. 17. Summary of values and attributes of the rice terraces as enumerated by participants during the FGD.

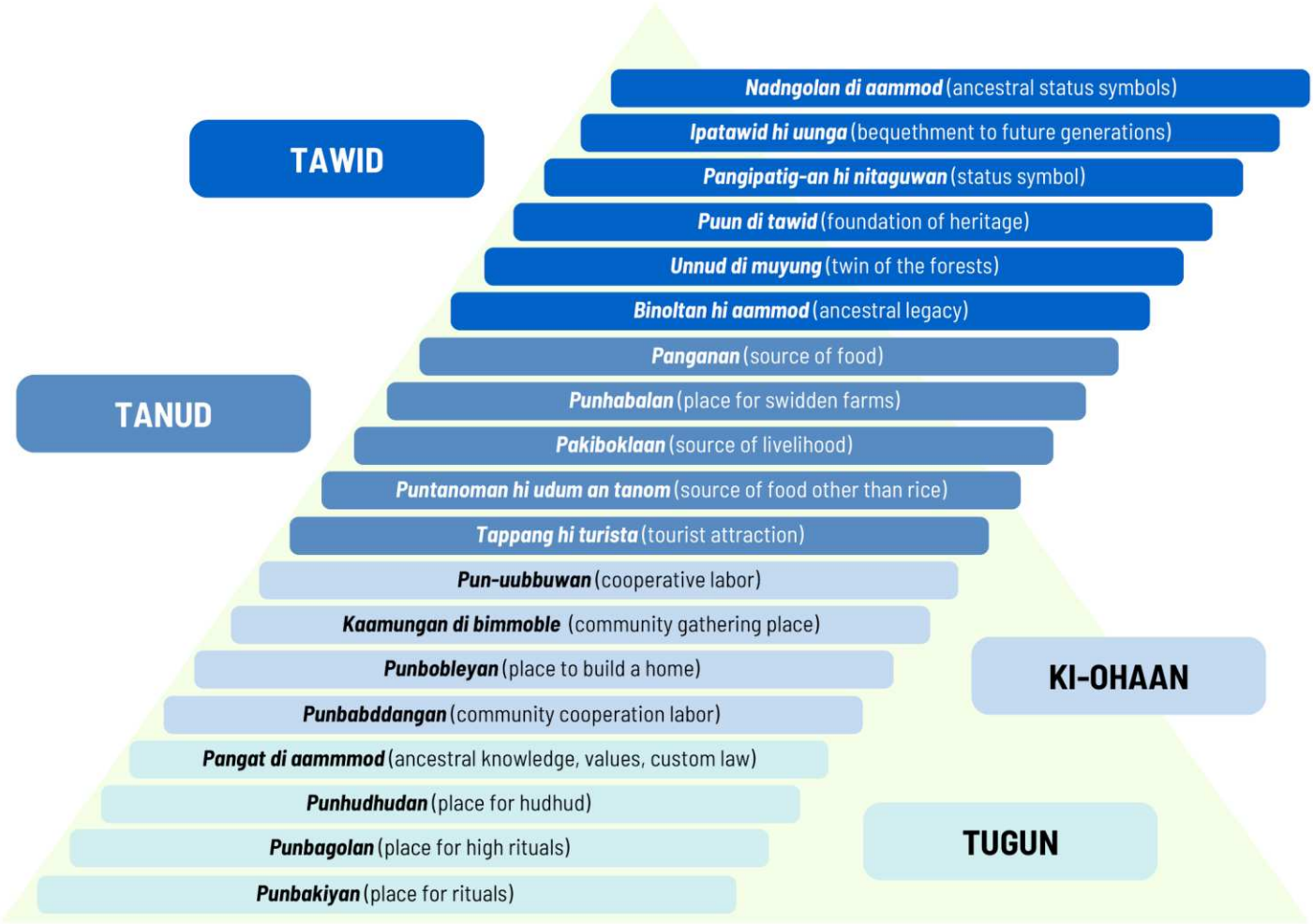


Fig. 18. Prioritization of attributes and classification into four major values.

5.2. Findings: Why do Ifugaos Value Their Rice Terraces?

The main question at the start of the workshop was, "Why are the terraces valuable to you?" or "What makes the terraces important to you?" Consistently, the majority of participants ranked the same values with similar degrees of importance.

Values are explained narrative, as the English translations cannot completely capture the rich nuances of the indigenous terms and concepts. Although participants enumerated more associated attributes than are presented above, these similar have been grouped under main values for purposes of brevity.

1. ***Tawid/Binoltan*** (Heritage value/Inter-generational responsibility)
2. ***Tanud*** (Economic value)
3. ***Ki-ohaan*** (Socio-cultural value)
4. ***Tugun di Kadaman ya pangat di aammod*** (lit."Lessons from the past and ways of the ancients," Traditional knowledge/IKSP value)

Key Value	*Associated Attribute [1]	Importance
TAWID/BINOLTAN (Ancestral legacy, inheritance,)	• rice fields *(payoh)* • forests *(muyung, pinugu, inalahan)* • village, human settlements *(boble)* • social status *(nitaguwan)* • memorial to the ancestors *(odon)*	**5**
TANUD (Economic, food source, employment)	• *Tinawon* (heirloom rice) and other crops grown on the terraces • Terraced landscape for tourists *(Nabnong an payo)* • Forest view for tourism *(bilid)* • Swidden farms as secondary food source *(Punhabalan/uma)* • Agro-forests for hunting and as source of crafts materials, construction, fruits, etc. *(inalahan/Pinugu/muyung)*	**5**
KI-OHAAN DI BIMMOBLE (Socio-cultural solidarity)	• Community cooperative labor *(ubbu, chawwa, changa, bachang)* • Community rice ritual *(kulpi, piesta)*	**5**
TUGUN YA PANGAT DI A'AMMOD (Indigenous knowledge systems and practices)	• Agricultural know-how *(Punpayo)* • Forest management *(Punmuyung)* • Swidden farming *(punhabal)* • Custom law, ancestral values *(Pangat di Aammod)* • Rice rituals *(Baki (Hongan di pa'ge)* - Rituals for persons *(Hongan di Tagu)* - A ritual field *(Tonak)* • An agricultural chief *(tumonak*)* **Batad and Bangaan* still maintains this traditional institution along with maybe just two other non-WH agricultural districts.	**4**

[1] Attributes are the physical or intangible things which are essential to these values

Fig. 19. Key values and their associated attributes rated in degrees of importance (5=very important 1=least important).

While the Hungduan, Mayoyao, Nagacadan, and Kiangan listed *TAWID* as the first value among equals, Batad interestingly prioritized *TANUD*. Being the most visited village by tourists among the World Heritage clusters, it should not be surprising that Batad somehow sees the economic value of the terraces a little more important than its heritage value.

5.2.1. *TAWID/BINOLTAN* (Heritage Value, Ancestral Legacy, Inter-generational Responsibility)

Tawid is a broad concept. In the wider definition of things, all the other key values can be subsumed as part and parcel of *tawid* in the context of intangible and tangible heritage and legacy. *Tawid* or *binoltan* embodies the notion of intergenerational connection and the transfer of material and immaterial heritage, knowledge, and traditions from one generation to the next. *Tawid* and *binoltan* translate to "that which has been passed down from an earlier generation." It encapsulates the essence of inheritance and legacy, symbolizing the deliberate act of bequeathing not only material possessions but also the intangible wealth of wisdom, customs, and values that define the cultural identity and heritage of the Ifugao people. The Rice Terraces as *"Tawid"* serves as a bridge between past and future, ensuring Ifugao heritage endures, enriches the lives of those who come after, and fosters a sense of continuity and belonging within the Ifugao community.

Among the Ifugaos, the inheritance of rice terraces follows the practice of primogeniture, where the eldest child, the panguluwan, irrespective of gender, inherits the majority of the parents' rice fields along with associated assets such as forests and family heirlooms.

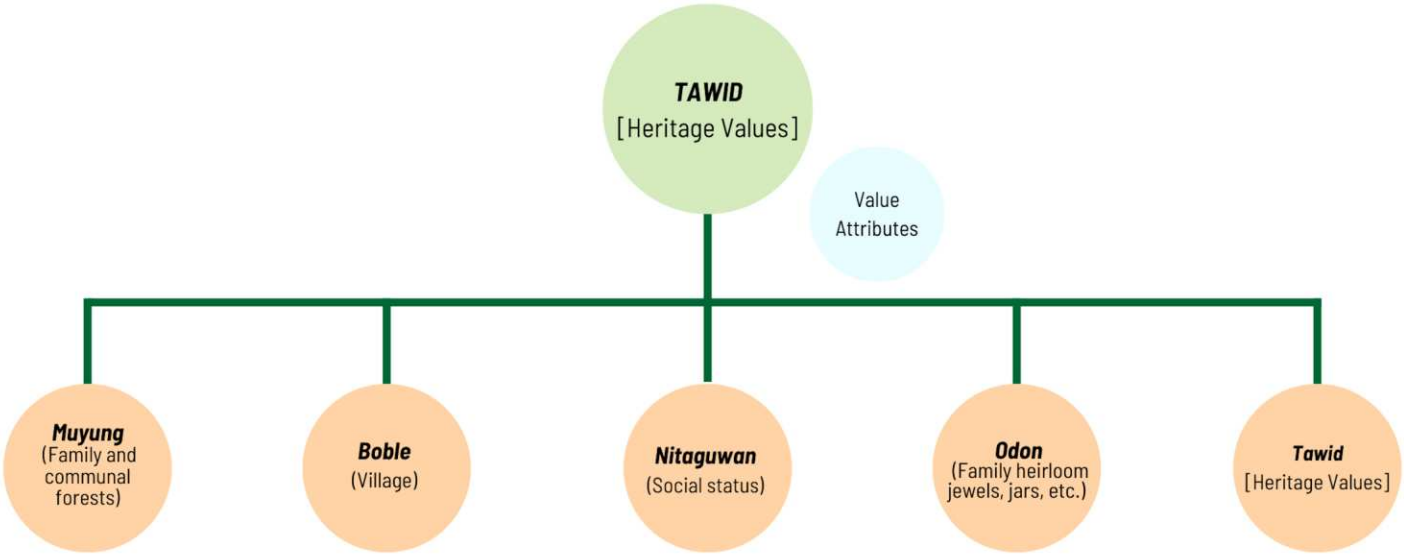


Fig. 20. Heritage Value and its attributes.

This inheritance tradition bestows both privilege and responsibility upon the firstborn, who, by virtue of receiving a larger portion of resources, is entrusted with the primary duty of providing the bulk of support for aging parents and assisting younger siblings in times of necessity. The *panguluwan* (root word, *ulu* or "head") is at the helm of a family or kinship group and is expected to be knowledgeable of custom law and traditions related to the terraces. Their role extends to keeping the integrity and unity not only of their respective families but also that of the *boble* or village.

In land stewardship, *Tawid* signifies the recognition that the rice terraces are not merely agricultural landscapes but living legacies that connect the Ifugao people to their ancestors and bind them to their descendants. It represents the idea that each generation is entrusted with the custodianship of these terraces, which are more than just fields; they are a testament to one's' belongingness and identity. The ownership of terraces anchors one to the land, the village and kinship group, ancestors and history. As the Ifugao saying goes, "Wherever an Ifugao treads, as long as their terraces endure, there lies their true sense of belonging."

Tawid encompasses preserving the intricate irrigation systems, the surrounding forests, maintaining the balance between man and nature, and passing on the profound knowledge of terrace farming techniques to ensure the terraces remain productive and resilient. This intergenerational commitment to land stewardship sustains the physical beauty and functionality of the rice terraces and also carries forward its cultural and historical significance. *Tawid* reinforces the belief that the rice terraces are a communal heritage, binding past, present, and future generations in a shared sense of responsibility and pride.

TANUD (Economic value; literally, a source of nourishment or food)

In the context of the Ifugao rice terraces, *tanud* is a holistic concept encompassing long-term food security, cultural preservation, and economic sustainability. It highlights the interconnectedness of agriculture, culture, and nature, emphasizing responsible land management, water conservation, and traditional practices. *Tanud* embodies the commitment to maintaining a delicate balance between nature and agriculture to ensure that the rice terraces remain productive and resilient, and that its forests are kept as hunting grounds and agro-production areas where food, medicine and raw materials are sourced.

Tanud underscores the careful and meticulous cultivation of rice in the terraces, with an awareness of how present actions impact future harvests. It involves responsible land and forest management, water conservation, and the preservation of traditional farming techniques that have been refined and passed down through the ages. Moreover, tanud recognizes contemporary economic opportunities in modern-day tourism that contribute to the community's economic well-being.

Rice is the staple food of the Ifugao, like the rest of the Philippines. Food security is measured by its constant presence on the dining table from the days of the ancients up to the present. The *tinawon*, or "once-a-year" heirloom rice varieties of the Ifugao nourished both elite and common classes of old Ifugao society. It is the only "ritual rice" of the Ifugao – a shift to modern, non-Ifugao rice varieties does not merit the performance of the rice rituals. This heirloom rice also carries cultural and economic importance.

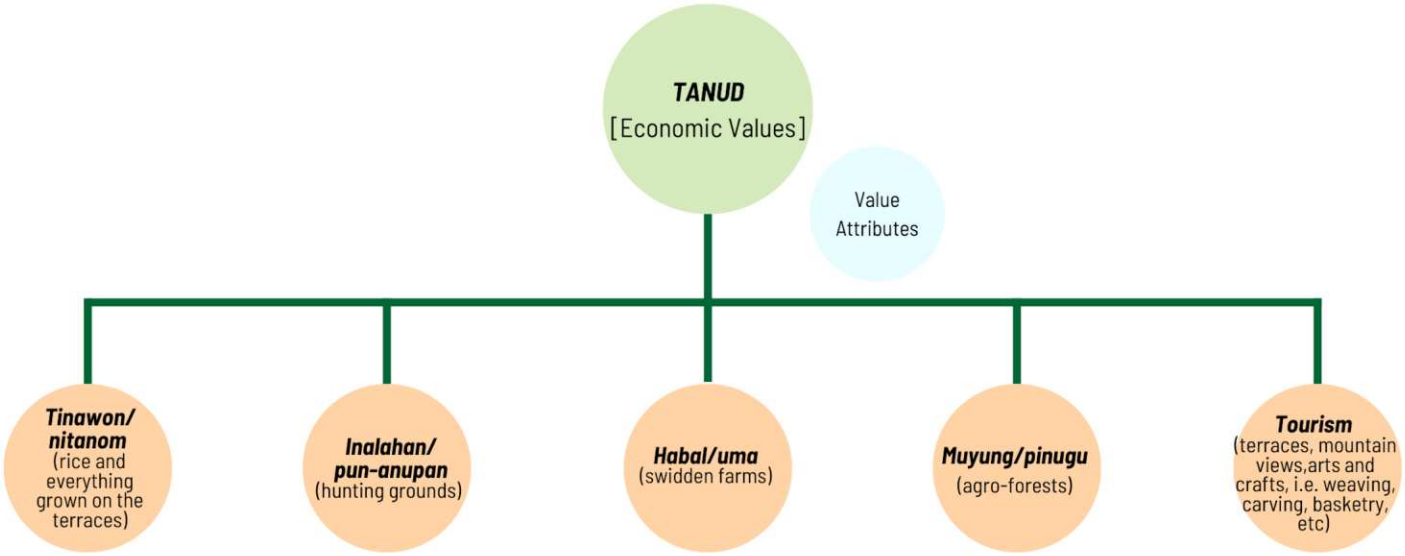


Fig. 21. *Tanud* (economic value) and its attributes.

The *tinawon* is renowned for its distinct flavor, unique aroma, and resilient growth in the terraced landscape. Its economic value extends beyond subsistence farming, as it has become a sought-after product in regional and even international markets. The cultural heritage attached to *tinawon* rice enhances its marketability, and the demand for this traditional variety provides a source of income for Ifugao farmers. Pricing has remained 200% above the average cost of rice in the Philippines. Local governments agree that it shouldn't go much higher than this, because farmers may opt to sell rather than consume the *tinawon* rice, and if they don't eat that rice, "they lose a part of being Ifugao."

Additionally, the rice terraces have evolved to become a source of employment, particularly through tourism and its various derivatives. In its economic context, *Tanud* recognizes that the terraced landscape, with its breathtaking beauty and cultural significance, attracts visitors from around the world. This influx of tourists has created opportunities for the local community, providing jobs in hospitality, tour guiding, traditional craft production, and more.

5.2.2 *KI-OHAAN DI BIMMOBLE* (Socio-cultural solidarity, community spirit)

Ki-ohaan is the practice of villagers coming together as a collective to work on the construction, upkeep, repair, or expansion of the rice terraces. This labor-intensive effort typically occurs during the land preparation stage, rice planting and harvesting seasons, when the need for maintaining the terraces is most crucial. It involves tasks such as repairing stone walls, cleaning irrigation channels, and planting or harvesting rice. Collectively referred to as punbabaddangan, the concepts of ubbu or reciprocal labor, bachang or community self-help, dang-a or volunteer work in construction, are manifestations of the Ifugao sense of community and interdependence. *Ki-ohaan* is more than just a labor force--it fosters a sense of unity and collaboration among community members, as they recognize that the success of their agricultural endeavors and the sustainability of their rice terraces rely on the combined efforts of all. *Ki-ohaan* in the context of collective labor in the maintenance of the rice terraces signifies not only the physical work done but also the cultural values of cooperation, mutual support, and the understanding that the sustainability of the terraces depends on the strength of the community working as one

Fig. 22. Children learn cooperative labor through rice planting in the terraces. (Source: SITMo, 2018)

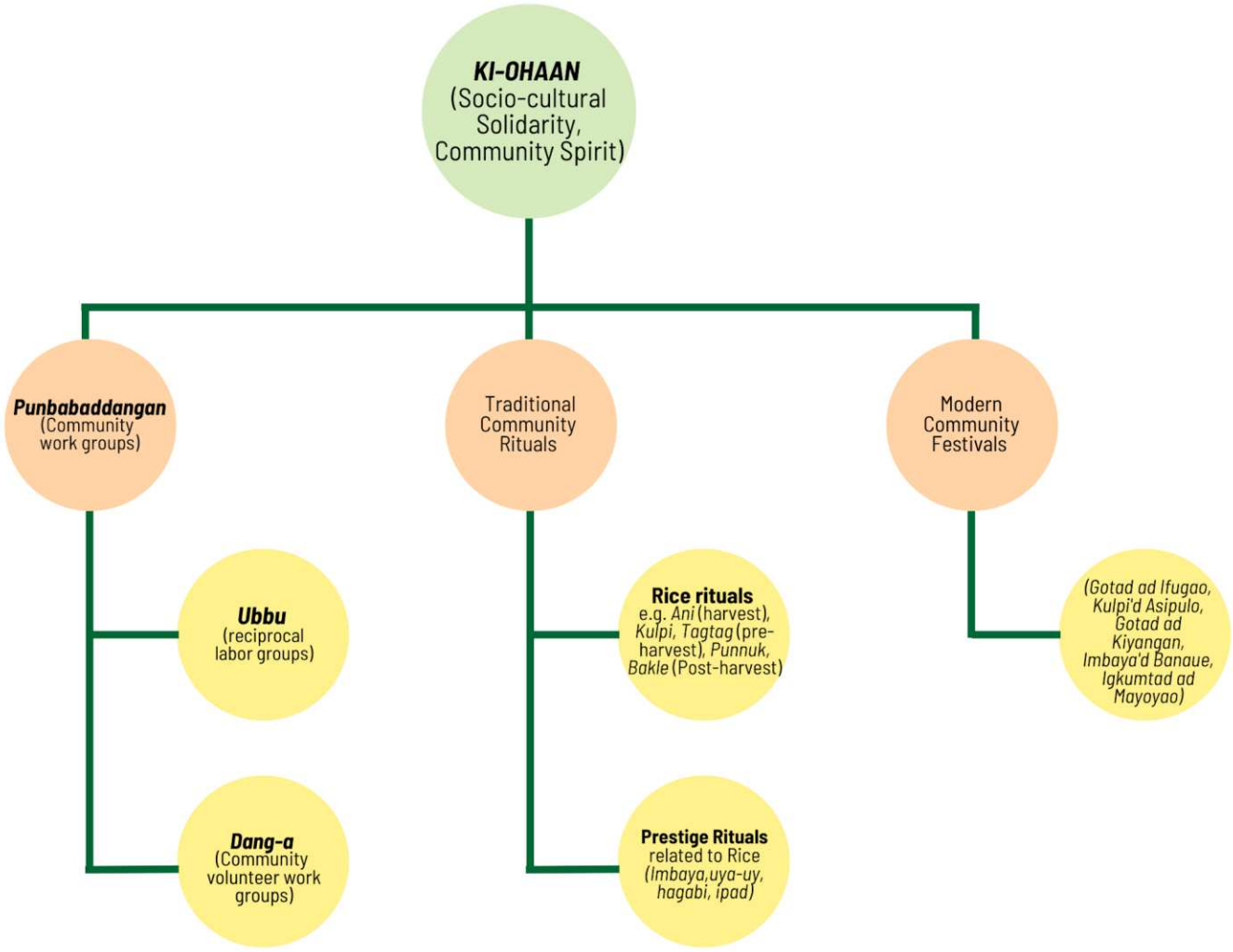


Fig. 23. *Ki-ohaan* (Socio-cultural solidarity value) and its attributes.

Ki-ohaan is used not only in times of work but also in times of festivities to share fruits of their labor. The celebration of *kulpi* and *tagtag*, rituals celebrated after all fields have been planted and the rice is robustly growing, the ani or the harvest ritual, the punnuk and the bakle to end the harvest season – are all celebratory rituals of communal nature. Other than these rice rituals, the rituals for persons that elevate the status of individual members of the community to a higher social rank are anchored on one's rice field holdings. The *kadangyan*, the Ifugao elite class, can only be recognized as such if their status is validated by community members through celebratory feasts of merit that include the *uya'uy*, the *imbaya*, the *ipad* or the *hagabi*. These traditional community rituals are the basis of present-day "fiestas" as sponsored by the different levels of local government in Ifugao Province.

5.2.3 *TUGUN DI KADAMAN YA PANGAT DI AAMMOD* (Indigenous Knowledge Systems and Practices (IKSP), Traditional Knowledge, Rituals and Custom Law; literally "lessons from the past and ways of the ancestors")

This value encompasses indigenous knowledge systems, practices and custom law, and is a foundational and deeply cherished value of the Ifugao rice terraces. It represents the cultural wisdom, traditional management system and governance that sustain the terraced landscapes and the communities that depend on them.

The sustainability and continuity of the Ifugao rice terraces are deeply intertwined with customary law and indigenous knowledge in the fields of rice agriculture, forestry, and swidden farming.

a. Customary Laws and Governance:

- **Land Tenure Systems:** Ifugao custom law includes traditional land tenure systems that govern access to and use of the terraced land. These systems prevent land overuse and degradation by allocating to specific families or communities.

- **Terrace Maintenance and Collective Responsibility:** Customary laws mandate communal labor, such as *ubbu* and *dang-a*, which involves collective efforts for maintaining the terraces. This shared responsibility ensures that no individual or family shoulders the entire burden of upkeep, contributing to long-term sustainability.

- **Resource Management:** Customary laws regulate resource extraction from nearby forests and watersheds, and enforce sustainable forestry practices to prevent deforestation. This is crucial for terrace irrigation and the maintenance of a stable water supply.

b. Indigenous Knowledge:

- Terrace Engineering: Indigenous knowledge has been passed down through generations, and has guided the construction and maintenance of the terraces. This knowledge includes techniques for selecting suitable terraced locations, building stone walls, and designing intricate irrigation systems.

- **Crop Varieties and Planting Techniques:** Indigenous knowledge plays a pivotal role in rice agriculture. It encompasses the selection of rice varieties that are adapted to the terraced environment and planting techniques that maximize yield while conserving soil fertility.

- **Swidden Farming:** Swidden farming, or shifting cultivation, is an integral part of the Ifugao agricultural system. Indigenous knowledge informs the timing and rotation of swidden fields, which prevents soil exhaustion and allows forest regeneration during fallow periods

c. Sustainability and Continuity:

Under Ifugao customary law, forests and water are collectively managed using indigenous knowledge systems. A central example is the *muyung* system, which has allocated zones specifically for communal forest management and safeguarding watersheds. The maintenance of forests (both individually owned and communal) involves practices such as selective cutting and assisted natural regeneration.

Transgressions, such as the reckless extraction of timber for personal benefit, unregulated harvesting, or other deviations from sustainable practices, attract community disapproval because of negative impacts on the common welfare.

- **Environmental Harmony:** Ifugao custom law and indigenous knowledge prioritize maintaining a harmonious relationship between people and the environment. This ensures the terraces' sustainability by preventing ecological degradation and ensuring a stable water supply.

- **Cultural Preservation:** These practices are vital for preserving Ifugao cultural heritage. Customary laws and indigenous knowledge passed down through oral tradition strengthen cultural identity and giver and receiver's connection to the rice terraces.

- **Resilience:** The combination of custom law and indigenous knowledge has made the Ifugao rice terraces resilient to external pressures such as modernization and climate change. Their adaptive practices have allowed them to endure for generations.

d. Traditional Institutions and the *Baki'n di A-ammod* (Indigenous Religion, Traditional Belief System, Spiritual Value)

The rice terraces are more than just feats of agricultural engineering; they are living testaments to the Ifugao's spiritual connection to the land. They are sacred grounds where tradition, spirituality, and community converge, and where the past and future are intricately bound by the enduring beliefs of the Ifugao people. Ancestral rituals dictate the terraces' upkeep and conservation.

Baki is a belief system of great complexity, encompassing a pantheon of over a thousand gods and spirits and practiced through a complex of rituals. Some examples include the recitation of sacred myths known as *hu'uwa* and *bukad*, and the chanting of epic stories like the *Alim* and the UNESCO listed intangible cultural heritage *Hudhud* chants or the performance of the *Punnuk*. These

rituals are a direct channel to the divine, and strengthen the harmony between the Ifugao people and the spiritual world around them.

One major classification of *Baki* rituals is the *Hongan di Page* (rituals for rice), specialized prayers are offered to the gods of agriculture with the sole purpose of improving the rice harvest. These rituals are profound expressions of gratitude, respect, and the deep understanding that the rice terraces are gifts from the divine. Other than that, like all other belief systems, the *baki* imposes restrictions on behavior that are tantamount to social controls. If one were to look closely, these are also scientific and practical applications enforced under the guise of religion.

An example of a practical act raised to the level of religion is the prohibition of collecting fish and shellfish from the terraces during the four months of the season of harvest. According to religious elders, the gods are at work in the terraces during this season and harvesting aquatic food from the pond fields during this time will offend them. Is it coincidence that this same period is also the time for the fish and other edibles to spawn and grow to maturity or is the religious prohibition meant to give nature a time to replenish itself?

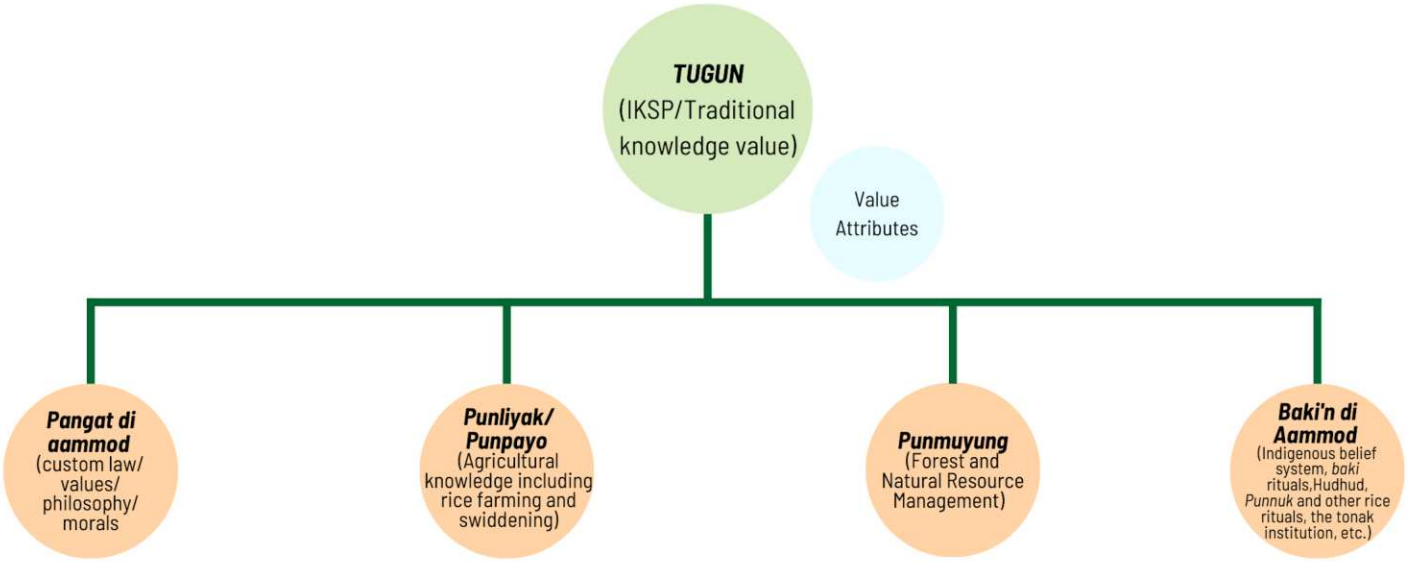


Fig. 24. *Tugun* (IKSP/Knowledge Value) and its attributes.

VI. Climate Projections

Chapter VI

6.1 Local Projection by the Climate Scientist

Overall, Ifugao Province is projected to have a hotter and drier climate in the future, dotted with more intense and extreme rainfall events and stronger tropical cyclones (see full list of climate extreme indices for Ifugao Province in Annex 1). Following this, rain-induced landslide and drought risks may also increase, coupled with further land and forest degradation and loss of biodiversity particularly due to wildfires, low seedling survival, heat stress and water shortage under a hotter and drier climate.

Fig. 25. Terrace walls are dried and cracked during drought. (Source: SitMo 2017)

For all charts:

- Top row are under RCP 4.5 or moderate emissions scenario maps.
- Bottom row: under RCP 8.5 or high emissions scenario maps.
- Left column: years 2036-2065
- Right column: years 2070-2099

Below are charts taken from the report of Laurice Jamero, sourced from PAGASAs CliMap.

Note that an increase in temperature averages and extremes become more pronounced with higher emission scenarios.

Temperature:

- Average temperatures are projected to increase in Ifugao Province (Fig. 26 for March-April-May).
- Temperature extremes are also projected to increase in magnitude, frequency, and duration.
- Notable rapid increase in the number of warm nights and hot days (Fig. 27) coupled with a decreasing number of cold nights and cool days.
- Most alarming is the sharp increase in the number of warm days, with the number of consecutive days with a daily maximum temperature exceeding the 90th percentile potentially reaching up to 262.7 days by the end of the century under the moderate emissions scenario, and up to 365 days for the high emissions scenario (Fig. 28).

Mean Temperature: March-April-May

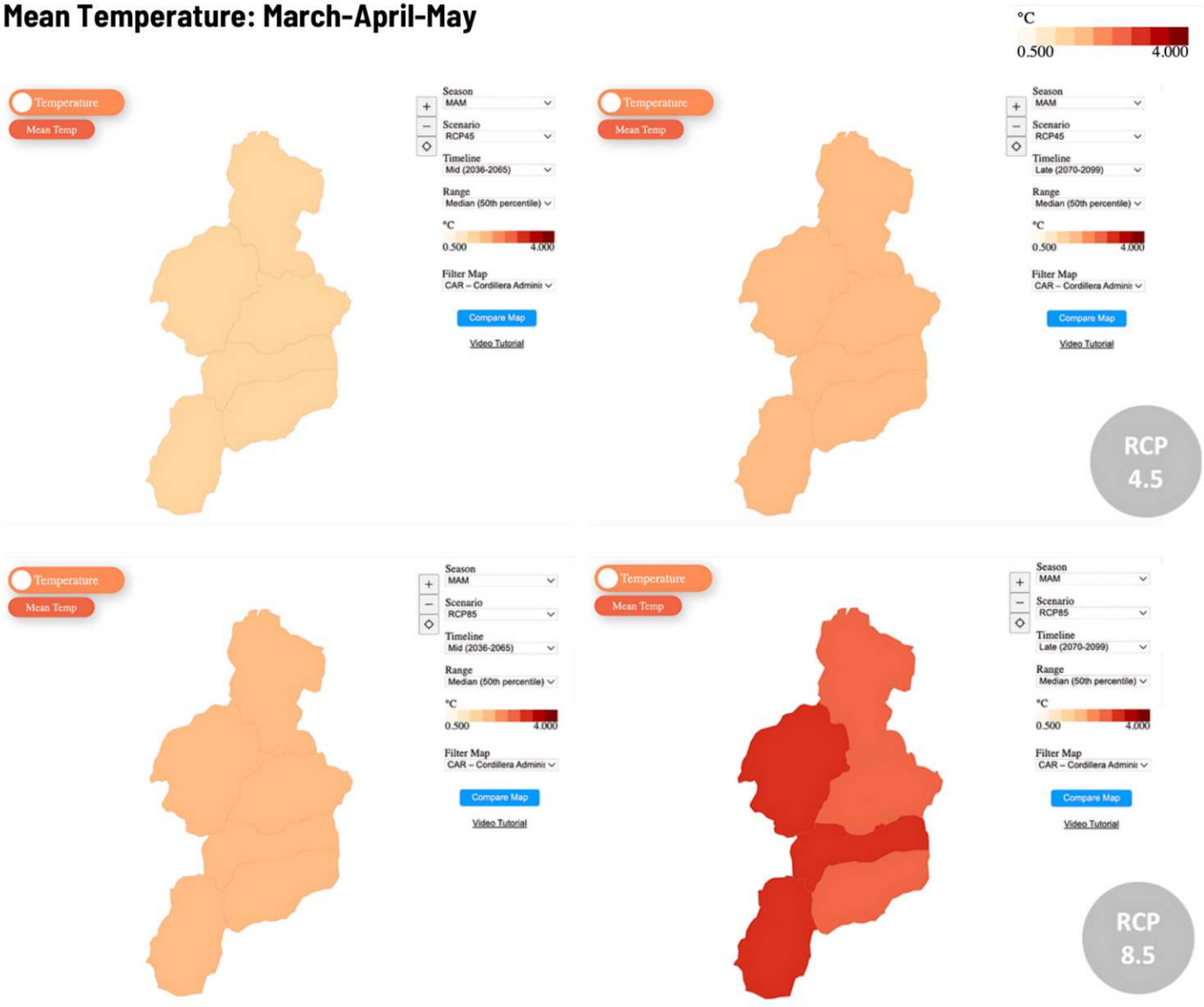


Fig. 26. Mean temperature in Ifugao Province for March-April-May.

Fraction of hot days

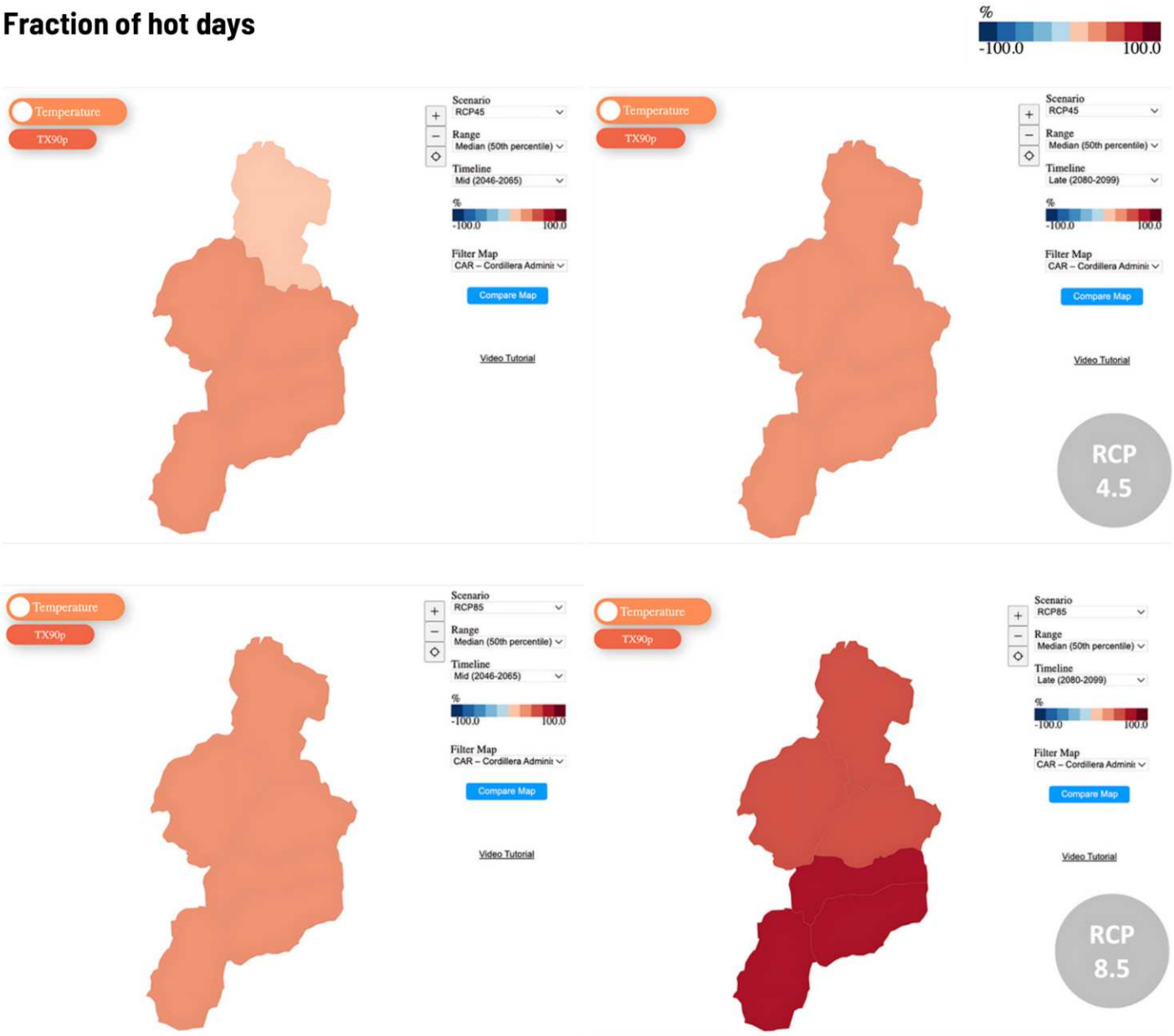


Fig. 27. Number of days contributing to warm period in Ifugao Province with maximum temperatures exceeding the 90th percentile.

Rainfall

- There is going to be an average drying tendency over Ifugao Province, with a decreasing total wet-day rainfall and decreasing average daily rainfall intensity (Fig 27)
- The number of consecutive dry days with rainfall of less than 1mm are also projected to increase (Fig 28).
- Against the background of an overall drier climate, however, rainfall extremes are also projected to increase.
- The number and intensity of extremely wet days (99th percentile) are projected to increase slightly, along with maximum 1-day (see Figure 9) and 5-day rainfall totals.
- While the same number of tropical cyclones can be expected to occur in the Philippines under a 2°C warmer world, there will be more Category 3 to 5 tropical cyclones.
- There will be an increase in the average peak intensity of all tropical cyclones and severe tropical cyclones, while also bringing higher rain rates (high confidence globally).

Average daily rainfall intensity

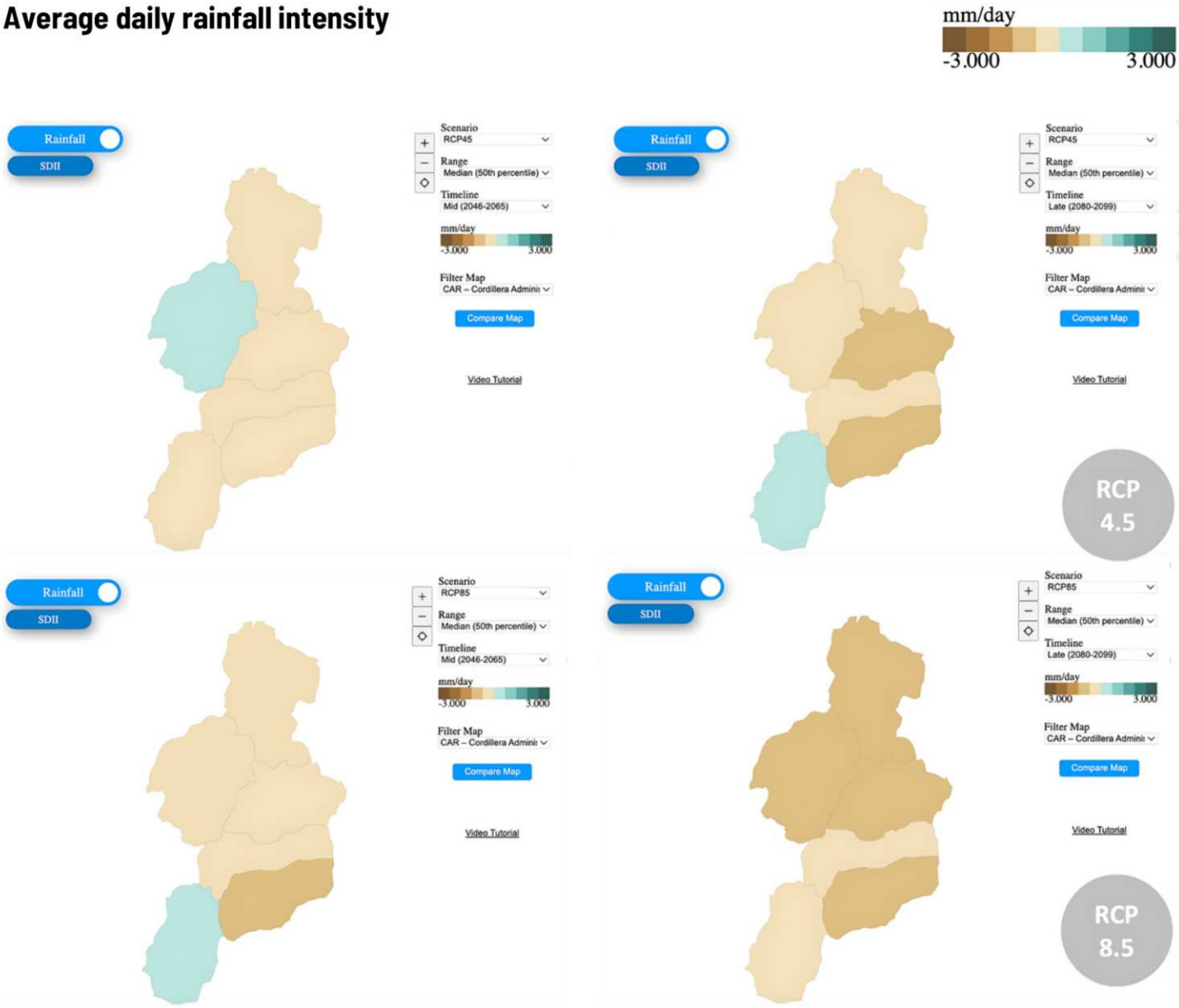


Fig. 28. Average daily rainfall intensity in Ifugao Province.

Consecutive dry days

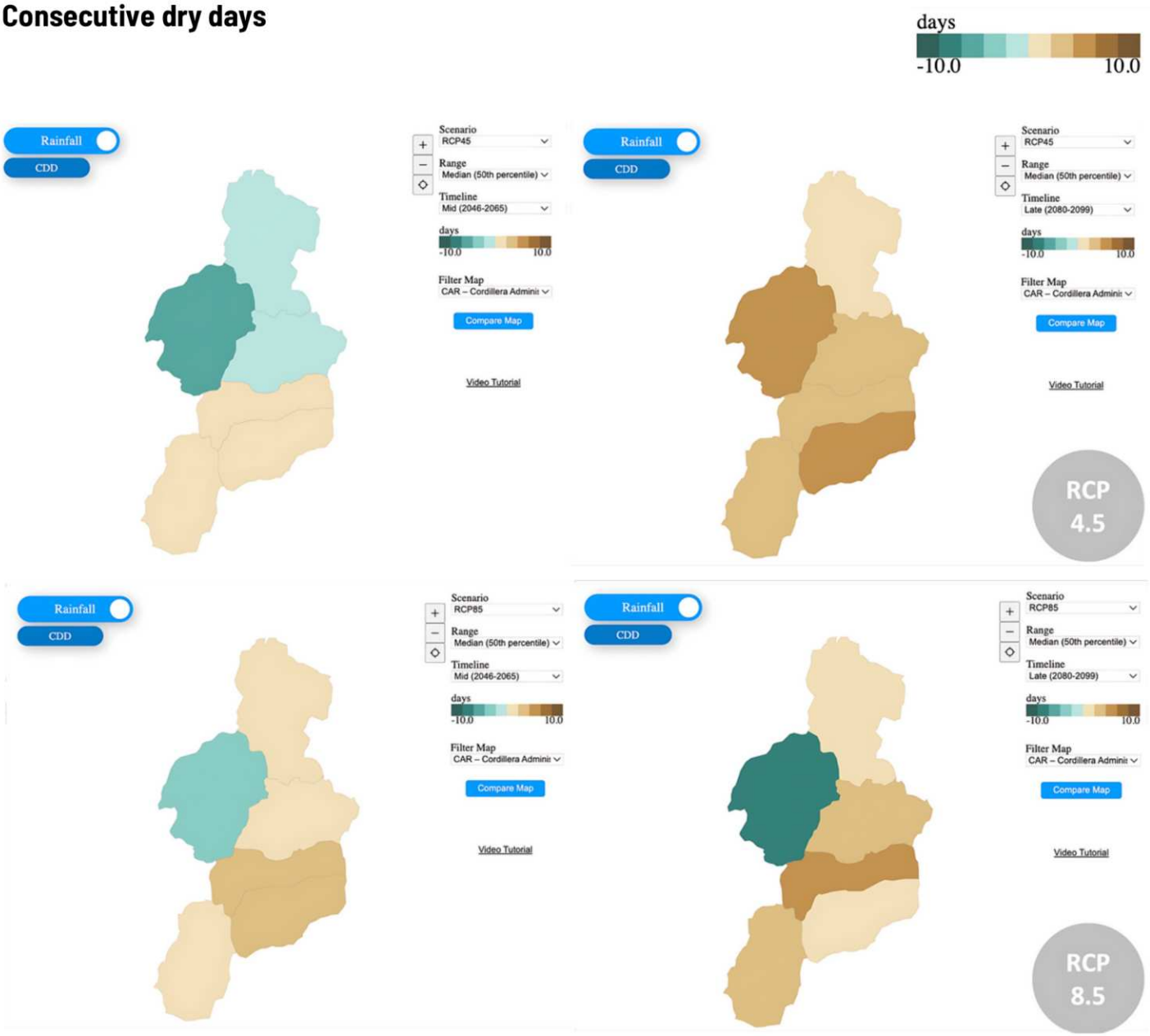


Fig. 29. Consecutive dry days in Ifugao Province with rainfall of less than 1mm.

Maximum 1-day rainfall

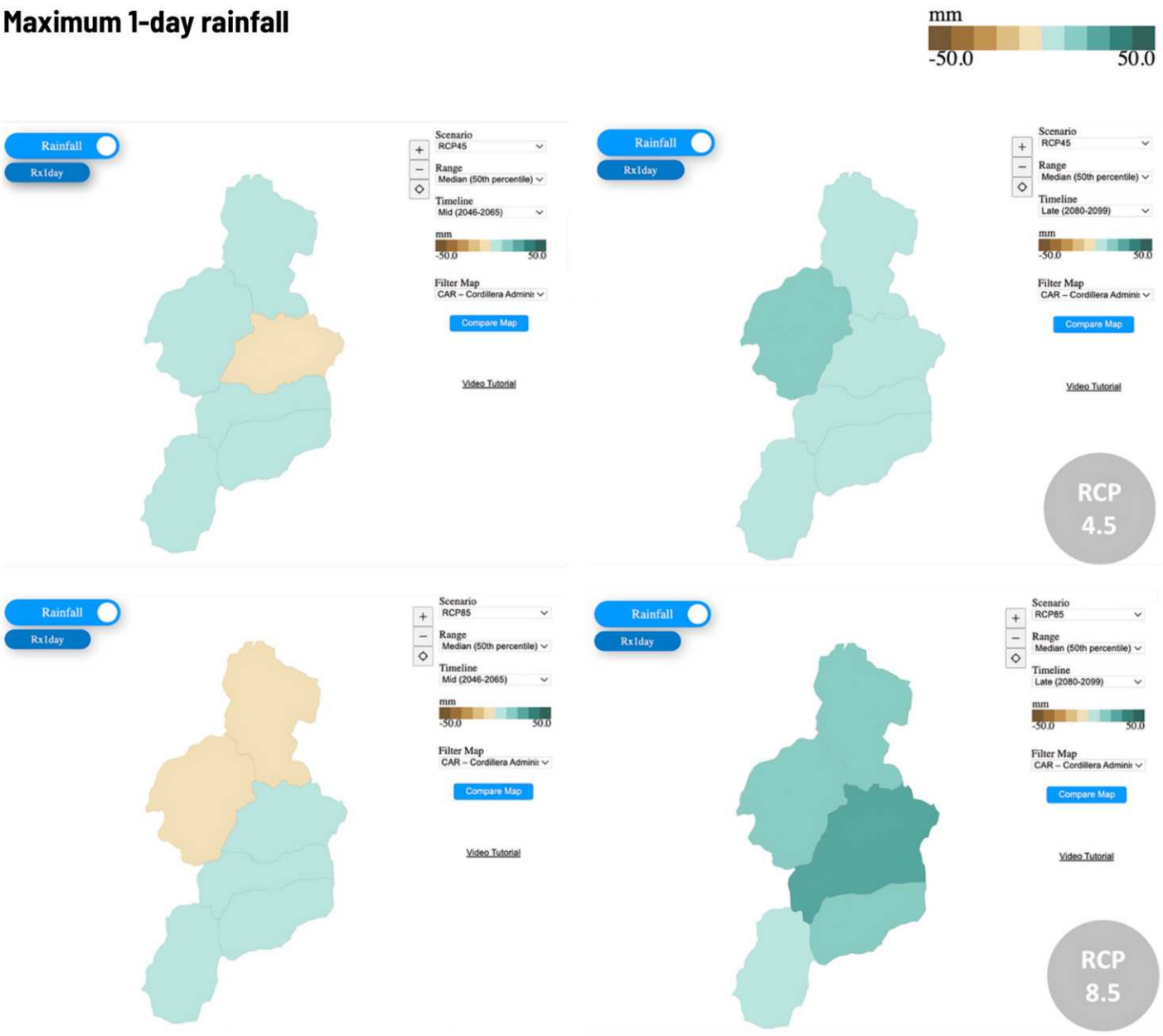


Fig. 30. Maximum 1-day rainfall in Ifugao Province.

6.2 Climate Solutions

To avoid the worst impacts of climate change, it is important to limit global warming to less than 1.5°C by halving greenhouse gas emissions by 2030 and achieving net zero by 2050. Among all of the available mitigation options for significantly reducing emissions by 2030 (see Annex 2 for full list), the largest potential contribution comes from the agriculture, forestry and other land use sector, such as carbon sequestration in agriculture, reduced conversion of forests and other ecosystems, ecosystem restoration, afforestation and reforestation. They are also cheaper than other technology-based options.

Indeed, supporting carbon sinks is an often overlooked but equally important approach to mitigation, alongside reducing carbon sources (Fig. 31). Land sinks, which absorb approximately 24% of carbon emissions, may be enhanced by:

1. Shifting agricultural practices,
2. Protecting and restoring ecosystems
3. Utilizing degraded land.

Indigenous peoples and local communities have historically and currently practiced all three land-based climate solutions.

However, beyond the 1.5°C global warming level, ecosystems and their biodiversity also become more vulnerable to climate impacts, some now rendered ineffective in reducing climate risks. Recent studies show that exceeding the 1.5°C limit set by the Paris Agreement could already trigger multiple climate tipping points, starting with the die-off of warm water coral reefs in the tropics, the collapse of Greenland and West Antarctic ice sheets, and the widespread and abrupt thaw of permafrosts. With this, the United Nations has declared this decade as the Decade on Ecosystem Restoration to protect ecosystems and their biodiversity and drive climate action.

Given that the underlying drivers of climate vulnerability are primarily socio-economic in nature (e.g. poverty, poor health, lack of education), reducing climate vulnerability and increasing adaptive capacity entails addressing those issues. Achieving the United Nations Sustainable Development Goals, the blueprint for people and the planet, is ideally taken as a collective to maximize synergies amongst each goal. Examples of adaptation options are provided in Annex 3.

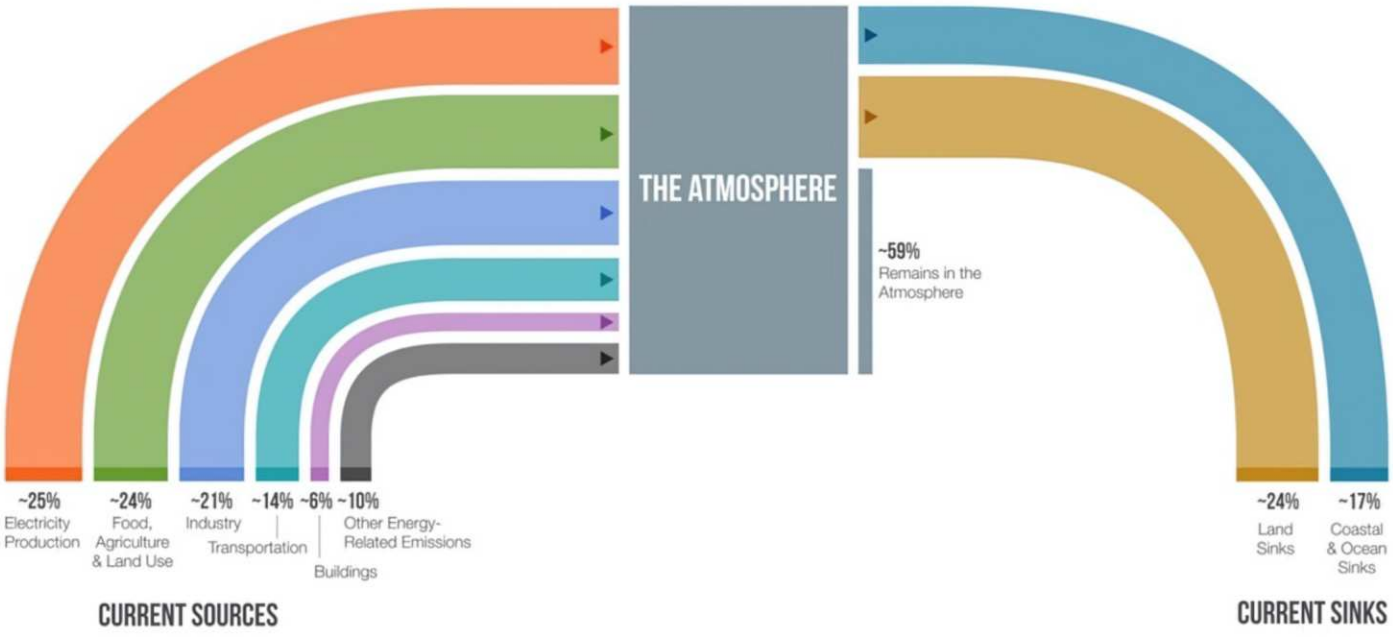


Fig. 31. Current carbon sources and sinks. (Source: Project Drawdown)

VII. Evaluating the Exposure, Sensitivity, and Adaptive Capacity of Key Values

Chapter VII

Fig. 32. Two weather patterns in Ifugao Province.

This Climate Vulnerability Assessment draws on indigenous knowledge, cultural traditions, and community perspectives that have sustained the terraces for generations. By placing local values centrally to the assessment, we seek to surface the nuanced vulnerabilities and resilience of Ifugao culture and honor the Ifugao people's wisdom and experience. The data provided herein aims to empower communities to co-create climate-adaptive strategies that safeguard their heritage and livelihoods.

Based on the Modified Corona Climate Classification, Ifugao Province has 2 climate classifications:

Type III, covering Mayoyao, Kiangan and Banaue from the east, is characterized by a short dry season. The western side, a small portion of the province falls under Type I characterized by wet and dry seasons. Hungduan has Type I in the west and Type III in east (Fig. 32).

7.1 Climate Hazards and Exposure

A Note on Methodology of Focus Group Discussions

During focus group discussions several key climate hazards were identified and elaborated upon by participants. Based on recommendations by both the climate scientist and Ifugao facilitator, climate hazards were surfaced by asking the group whether they noticed any weather changes in recent times, and how these affected the values they ascribed to the terraces. None of the specific data from the climate scientist was disclosed to the community, to keep the discussion to a sphere that was accessible by the community, and in order to prevent the data from influencing their experiences.

Weather descriptions were kept rather broad. For example, temperature rise was described merely as "hotter", rather than referring to the specific 2°C increase. This is because there is no Ifugao equivalent for that specificity, and thinking in degrees falls outside the Ifugao worldview. In the culminating stakeholder discussion outside of the FGDs, where government officials, professional members of the Ifugao community, and farmers were present, the question of a 2°C was posed.

Climate Hazards

The Ifugao Rice Terraces are confronted with the multifaceted effects of climate change. Their tiered configuration and dependence on meticulous hydrological regulation make them particularly susceptible to large shifts in rainfall, temperature dynamics, and extreme meteorological phenomena such as intense typhoons, thunderstorms, and prolonged droughts. Heightened risks of soil erosion, landslides, and ecological imbalance within the terraced ecosystem underscore its vulnerability. Today, villages face formidable challenges in mitigating the repercussions of these natural disasters on their livelihoods, and cultural and agricultural heritage.

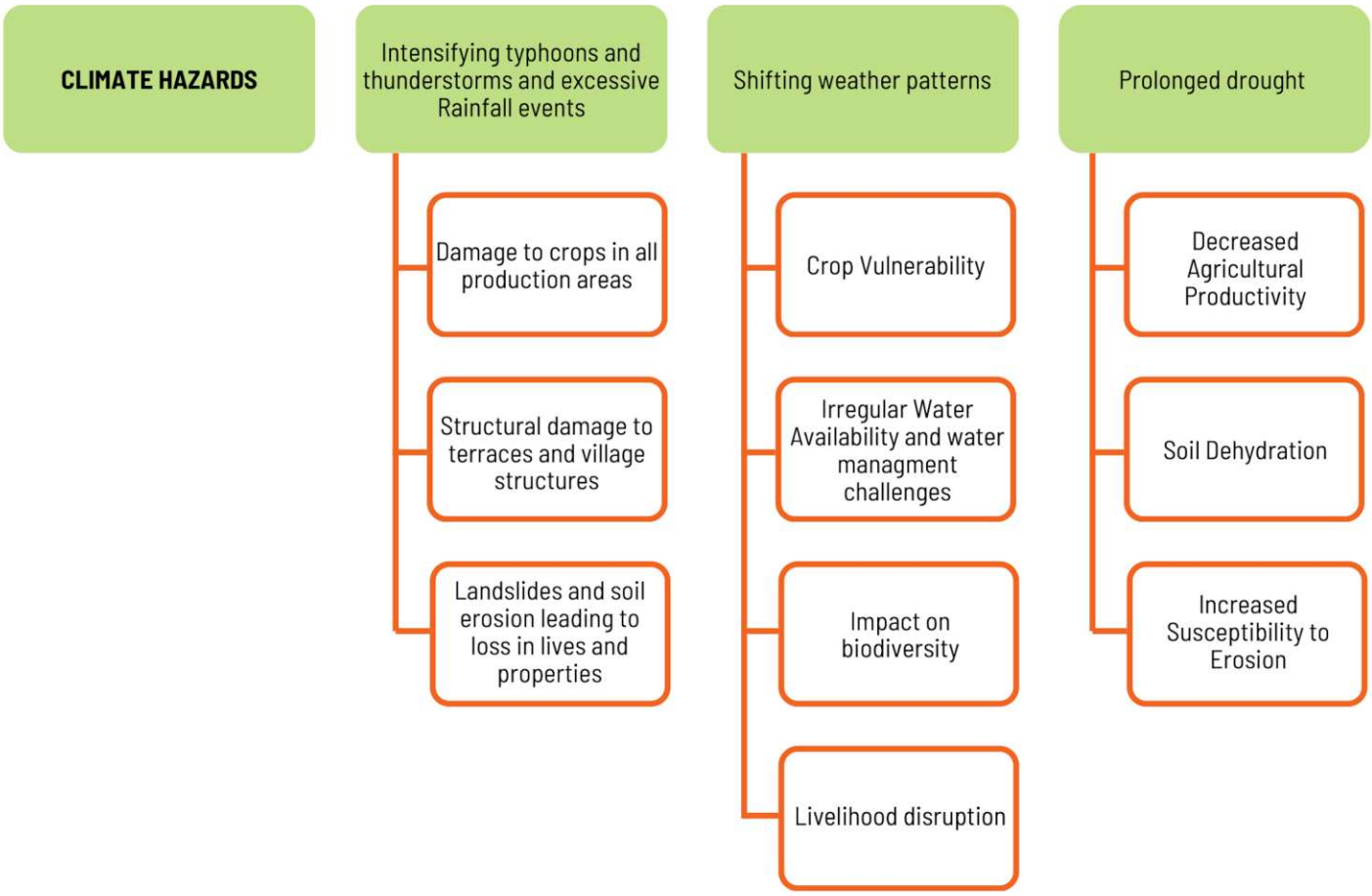


Fig. 33. Climate hazards surfaced by the community.

Climate hazards have disrupted traditional agricultural calendars and labor practices. Farmers have stopped reliance on traditional weather indicators to guide agricultural activities, though these would still be useful especially in a changing climate. Furthermore, the intangible cultural aspects of the Ifugao, including rituals and traditional knowledge, are intricately connected to the natural environment.

The timing of ceremonies and agricultural practices is deeply rooted in ecological cues, so that variations in weather patterns changes when or whether these ceremonies are celebrated. Climate hazards therefore also pose a direct threat to the continuity and authenticity of these cultural practices.

7.1.1 Intensified Typhoons, Thunderstorms and Rainfall Events

Communities report that typhoons are increasing in frequency, escalating in intensity, and certainly outpace the capacity of local communities to cope with or adapt to such rapid environmental changes. Fig. 33 shows the region has endured the onslaught of 122 tropical cyclones over the last six decades, with 54% of them being typhoons and super typhoons. Majority of these events occur between July to December, often making landfall in Northern Philippines, where the rice terraces are located. Landslides, soil erosion, and slope erosion caused by heavy downpours have damaged village infrastructure and structurally impaired terraces (Fig. 35). Additionally, the typhoon's strong winds and heavy rainfall alone can lead to crop destruction and loss of livelihoods for farming communities. Often a farmer does not have enough savings to bounce back from an eroded terrace, structural damage to terrace or home, or destroyed crops.

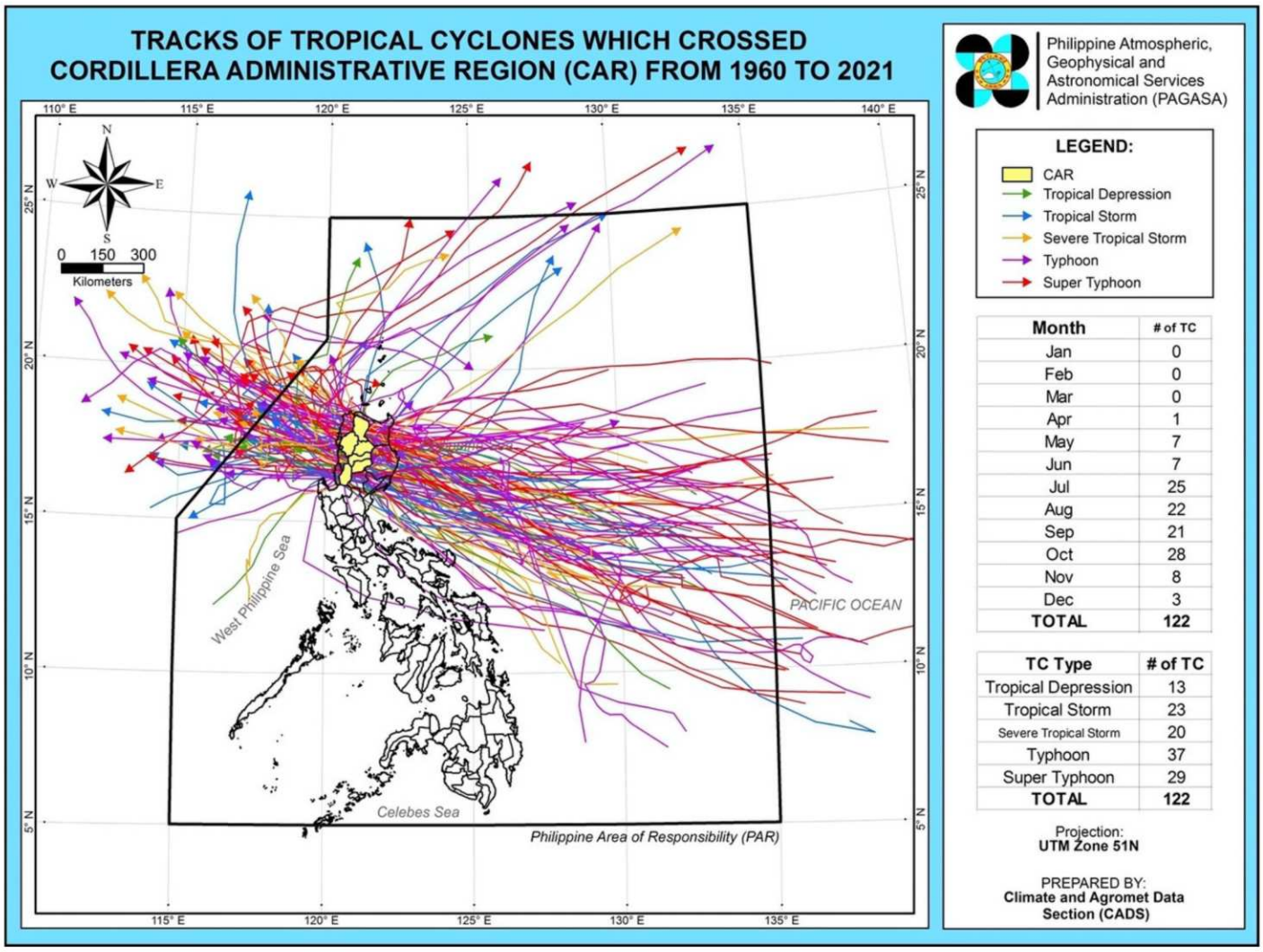


Fig. 34. Tracks of tropical cyclones which crossed the Cordillera Administrative Region (CAR) from 1960 to 2021. (Source: Philippine Atmospheric Geophysical Astronomical Services Administration (PAGASA) Climate and Agromet Data Section (CADS)

Fig. 35. Rain-induced landslide in the middle of the Batad Terraces cluster. (Source: SITMo, 2012)

Heavy rainfall can result in waterlogged fields, soil erosion, and inundated agricultural areas when traditional water channels breach their carrying capacity. These events can disrupt planting and harvesting activities, leading to reduced crop yields and food insecurity among communities reliant on terrace farming.

A study by the Asian Development Bank, the Department of Environment and Natural Resources, and the Public Private Partnership Center shows that floods do not greatly affect the rice terraces, except in certain hotspots on the eastern side of Kiangan. However, farmers in the workshop surfaced concerns about the variability of rainfall patterns and unpredictability of tropical cyclones that occur even during the summer.

Participants remembered the massive flash flood on July 7, 2022, caused by a freak thunderstorm. The flood ran down the center of Banaue, leaving a trail of destruction in its wake (Fig. 36). The communities are ill-equipped for weather anomalies, and the prospect of these occurrences becoming a regular phenomenon raises concerns for unprepared villages

Crop Destruction
Heavy rainfall can result in inundated fields and soil erosion, leading to reduced crop yields or in the case of torrential rains, complete crop destruction. When traditional water channels breach their carrying capacity, fields get waterlogged. This affects seed germination and crop growth, especially when this occurs during the sowing period, when the water level is reduced just to keep the seeds moist. Effects range from disrupted planting and harvesting activities, to outright food insecurity among communities reliant on terrace farming.

Structural Damage
Strong typhoon winds can weaken and damage terrace walls, especially in areas where the stones are not securely fitted. The impact of debris carried by strong winds can also contribute to structural deterioration.

Soil Erosion and Landslides
Steeply terraced terrain is particularly vulnerable to heavy rainfall. The force of torrential rains can dislodge soil leading to degradation of terrace walls and the loss of fertile topsoil. The same study by the Asian Development Bank et al. shows a high concentration of rain-induced landslides in the areas of all the rice terraces (Fig. 37).

Fig. 36. Banaue, Ifugao floods after heavy rains poured from apartments and inundated roads, July 10, 2022. (Source: PNP Banaue through Manila Standard)

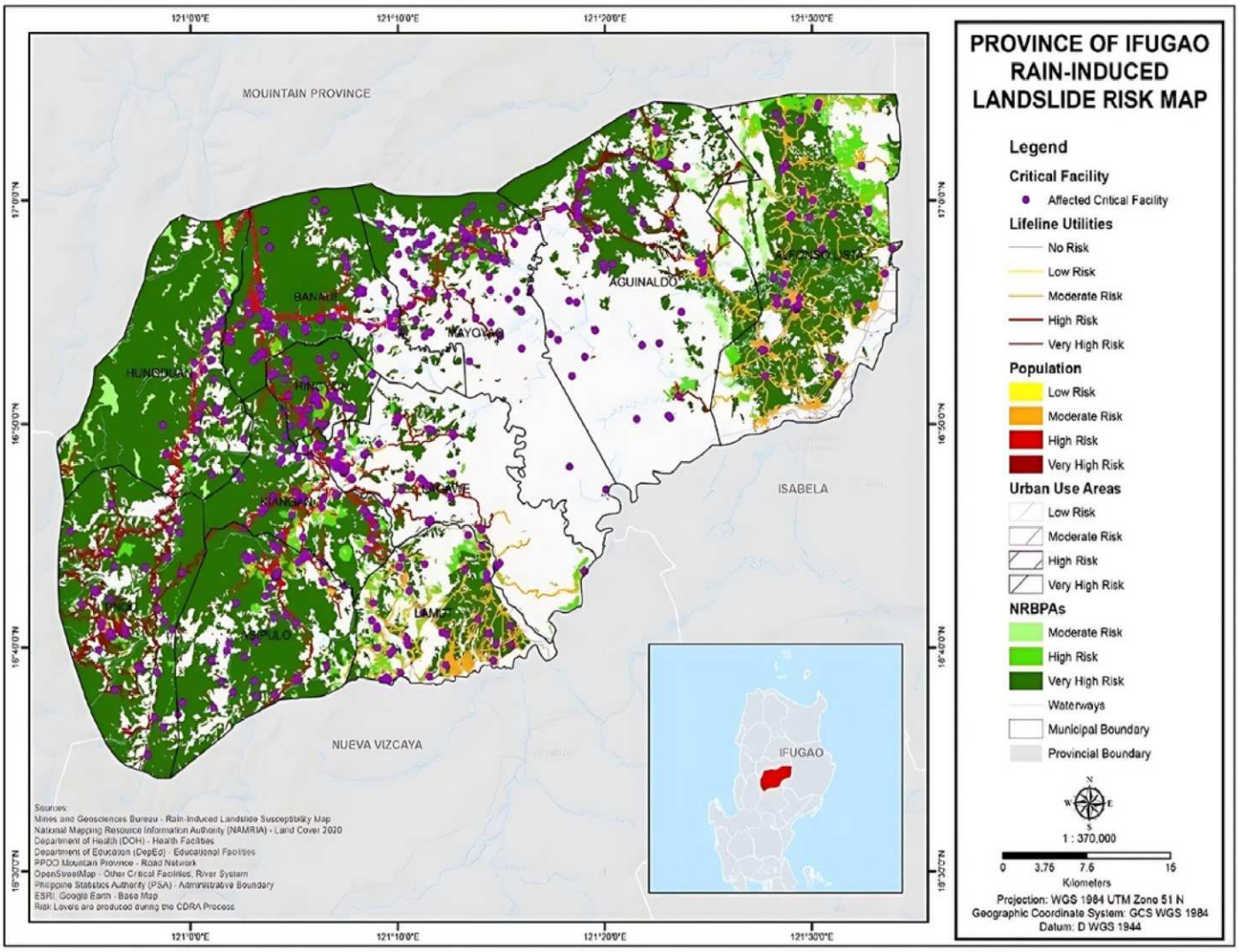


Fig. 37. Rain-induced landslide risk map. The project study sites have high to very high rain-induced landslide risk. (Source: Ifugao Risk Resiliency Roadmap and Investment Portfolio, 2023)

7.1.2 Shifting Weather Patterns

Shifting weather patterns, including unpredictable rainfall and temperature variations, can alter the timing of planting and harvesting. It also disrupts traditional farming practices that rely on seasonal cues. Moreover, unpredictable weather makes it difficult for farmers to plan and manage their crops effectively, leading to decreased productivity and income.

7.1.3 Prolonged Droughts

Periods of drought, with infrequent watering, leads to reduced soil moisture. If this occurs during crucial growth stages, crops will fail. Droughts exacerbate food insecurity and economic hardships for farming communities, leading to increased vulnerability to climate change impacts.

Soil Dehydration
Prolonged droughts result in reduced soil moisture, leading to soil dehydration. Soil shinkage and cracking weakens terrace wall stability, and consequently the overall structural integrity of the landscape.

Decreased Agricultural Productivity
The agricultural cycle relies heavily on a continuous supply of water. When water is insufficient, it hinders the growth of crops, leading to decreased productivity and potential food shortages for the community.

Increased Susceptibility to Erosion
Dry, compacted, and cracked soil caused by drought becomes more susceptible to erosion. With rainfall, the hardened soil will not absorb water efficiently, and this will result in more runoff and erosion, that threatens the stability of the terraced landscape. In all scenarios, the interconnectedness of terrace structures and the delicate balance between soil, water, and vegetation is critical to the terraces' physical integrity. Climate-induced disturbances disrupt this equilibrium, leading to cascading effects on the ecological and agricultural functions of the Ifugao terraces. As extreme weather events become more unpredictable and intense, the toolbox to build resilience must be expanded. Preserving the physical resilience of the terraces requires a multifaceted approach using traditional knowledge, sustainable land management practices, and scientific climate adaptation strategies.

7.2 Climate Sensitivity

The Ifugao Rice Terraces system, comprising terraced fields, surrounding forests, villages, and intangible cultural elements, has a pronounced climate sensitivity. It is susceptible and responsive to various climate stimuli, such as typhoons and thunderstorms. The intricate system of terraces, designed for water management and rice cultivation, faces heightened erosion risks and structural damage during extreme precipitation events. Excessive rainfall compromises both the physical integrity of the terraces and the delicate balance of water distribution essential for agriculture.

The shifting weather patterns, symptomatic of contemporary climate changes, disrupt the traditional ecological rhythms. The biodiversity and ecosystems in the terraces and surrounding forests are altered by precipitation and temperature patterns. Livelihoods become precarious, and resilience is tested.

Moreover, rituals and traditional knowledge, deeply tied to ecological cues, are highly responsive to changes in weather patterns. For instance, the increasing unpredictability of thunderstorms during August, leading to stronger river currents, renders the execution of the *punnuk* tugging ritual at the Hapao River nearly impossible. This ritual, recognized as a UNESCO-listed Intangible Cultural Heritage of Humanity, relies on favorable river conditions, illustrating the intricate relationship between environmental factors and cultural practices.

7.3 Climate Vulnerability: The Socio-economic Factors of Vulnerability

7.3.1 Economic Dependence and Vulnerability

Majority of communities within the Ifugao rice terraces cultivate rice as a primary source of livelihood. This economic reliance on a single crop renders them susceptible to climatic variations. Even if they take on a secondary income from traditional crafts (weaving, woodcarving, and artisanal crafts), they would still be economically vulnerable because sales rely heavily on tourism, an industry profoundly influenced by weather conditions. A compelling illustration is the flash flood in Banaue during July 2022, which caused a temporary shutdown of the tourist town for extensive cleanup operations. This hiatus disrupted the local economy, with its closure of the shops, restaurants, and hotels where these traditional products are typically sold. Consequently, the economic vulnerability of these communities is underscored by the interconnectedness of their livelihoods with both agricultural and tourism sectors, both intricately entwined with climate-sensitive variables.

7.3.2 Resource Constraints and Infrastructure Challenges

Rural communities within the vast expanse of the rice terraces grapple with limited access to essential resources, including education, healthcare, and basic infrastructure. This restricted access hampers their daily functionality which is exaggerated post-disaster. For example, the absence of road networks disables a timely provision of emergency services. In such remote areas, local governments often allocate significant portions of already meager funds to address the needs of these communities.

A prolonged debate in several terrace communities on whether government roads should reach the main village was surfaced by a Batad village workshop. Some argue that opening roads might compromise the villages' rustic appeal to tourists and because many visitors prefer trekking the trails to reach the terraces. There is a road in Hungduan town that is supposed to pass through the main façade of the heritage cluster of Kiangan municipality, but is currently blocked by conservation dialogues, because it contradicts World Heritage guidelines. The dilemma raises a broader question of prioritization: how can the government balance cultural heritage conservation requirements and still meet the fundamental needs of its constituents?

Limited government funding and minimal or absent infrastructure stresses the vulnerabilities of these remote communities during extreme weather events.

7.3.3 Poverty and Inequality

Widespread poverty and unequal distribution of wealth characterizes many regions within the Ifugao rice terraces. The prevalence of poverty intensifies vulnerability to the impacts of climate change, primarily because impoverished households possess limited capacity to invest in adaptive measures and recover from losses incurred due to climate-related events.

7.3.4 Social Cohesion and Governance

The strength of social networks and community governance structures improves resilience to climate change. Communities with strong social cohesion and effective governance are better able to organize collective responses to climate risks and access external support mechanisms.

7.3.5 Access to Information and Technology

Limited access to climate information and technological resources can impede adaptive capacity in the rice terraces. Improved access to weather forecasts, agricultural innovations, and climate-resilient technologies can enhance communities' ability to respond to climate risks.

7.3.6 Cultural and Indigenous Knowledge

Despite the potential of traditional knowledge systems to provide valuable insights for climate adaptation, these systems are challenged by cultural erosion and changing social dynamics within the Ifugao community. Younger generations often show reluctance to learn traditional practices. Nonetheless, actively preserving and carefully integrating indigenous knowledge with modern adaptation strategies can significantly enhance resilience in managing Ifugao rice terraces. One approach to achieving this is by institutionalizing indigenous knowledge of climate awareness into formal school curricula.

7.4 Impact on Values

1 None | 2 Low | 3 Moderate | 4 Extreme

Key Value	Key Attributes Impacted	Top Hazards	Significant Factors [Impacts to date, physical exposure (E) and sensitivity (S), social and economic factors of vulnerabilities (V)]	Potential Impact*
TAWID (Ancestral legacy, inheritance)	Terraced fields *(payo)*	• Intensified typhoons and thunderstorms • Excessive rainfall • Shifting weather patterns	The rice terraces are directly exposed to intense tropical cyclones and increased precipitation. They have heightened sensitivity to changes in precipitation, which can cause terrace water logging (which diminish seed germination and crop growth, especially when this occurs during the sowing period when water level is reduced just to keep the seeds moist, (Fig. 38) and erosion. What makes them more vulnerable in this regard is their structural complexity and dependence on precise water management. Effects range from disrupted planting and harvesting activities, to outright crop destruction and food insecurity among communities reliant on terrace farming.	3
		• Prolonged droughts	The rice terraces are highly susceptible to drought periods, which can severely impact agricultural productivity and livelihoods because they rely heavily on rain for irrigation. Droughts reduce crop growth, and heightens vulnerability to reduced yields, income loss, and soil erosion. Parched, cracked land can ultimately compromise structural integrity.	
	Family and communal forests *(muyung)*	• Intensified typhoons and thunderstorms • Excessive rainfall	The protective forests surrounding the rice terraces are directly exposed to intensified typhoons and thunderstorms as well as excessive rainfall. This renders them highly sensitive to changes in precipitation and at increased risk of soil erosion and landslides, ultimately exacerbating their vulnerability to damage and compromising their ability to safeguard the terraced landscapes and support the agricultural activities of the surrounding communities.	2

Key Value	Key Attributes Impacted	Top Hazards	Significant Factors [Impacts to date, physical exposure (E) and sensitivity (S), social and economic factors of vulnerabilities(V)]	Potential Impact*
TAWID (Ancestral legacy, inheritance)	Village *(boble)*	• Intensified typhoons and thunderstorms; • Excessive rainfall • Shifting weather patterns	Villages are directly exposed to intensified typhoons and thunderstorms. Their sensitivity to changes in precipitation, coupled with the risk of soil erosion and landslides from excessive rainfall, heightens their vulnerability. Typhoons threaten both the structural integrity of the villages and the well-being of the communities. Shifting weather patterns affects traditional livelihood activities in the village.	3
		• Prolonged drought	Villages in the rice terraces are exposed to prolonged droughts. They are sensitive and vulnerable to water scarcity and reduced agricultural productivity. Droughts challenge livelihoods and the sustainability of the communities, especially those that rely solely on the terraces for their sustenance.	
TANUD (Economic, food source, employment)	Traditional rice and other food sources in the terraced fields *(Tinawon)*	• Intensified typhoons and thunderstorms • Excessive rainfall • Shifting weather patterns	**Exposure** • Tinawon rice and other crops face direct exposure to intense tropical cyclones and increased precipitation. Risks include crop damage and infrastructure destruction. **Sensitivity** • These crops are highly sensitive to changes in precipitation patterns, which leads to waterlogging, soil erosion, and increased susceptibility to pests and diseases (Fig. 39). • Shifting weather patterns may disrupt traditional planting and harvesting cycles, impacting agricultural activities and reducing yields. • Tinawon and other rice varieties were estimated to have high sensitivity to temperature increase. **Vulnerability** • The reliance of tinawon rice and other food sources on precise water management and ecological balance heightens their vulnerability. • Intense cyclones and increased precipitation can result in crop damage, income loss, and food insecurity, necessitating adaptations in agricultural practices. • Shifting weather patterns may threaten the cultural and ecological integrity of the rice terraces, requiring adjustments to maintain sustainability.	4
	Swidden farms *(Habal / Uma)* Agro-forests *(Muyung)*	• Prolonged drought	**Exposure** • Tinawon rice and other crops are directly exposed to prolonged drought conditions, mainly caused by El Niño. • Drought can lead to soil moisture depletion, that hinders germination, growth, and crop yield in the terraced fields, swidden and agro-forests. **Sensitivity** • These crops exhibit high sensitivity to drought stress, impacting overall productivity. • Prolonged drought can exacerbate soil erosion, nutrient depletion, and pest infestations, further compromising crop health and resilience. **Vulnerability** • The vulnerability is high due to their dependence on regular water supply. • Drought-induced crop failures can result in economic losses, food insecurity, and disruptions to the cultural and ecological balance of the rice terraces. • Adaptation strategies such as water conservation, drought-resistant crop varieties, and improved irrigation practices are essential for mitigating the impacts of prolonged drought on agricultural livelihoods and sustainability in the Ifugao rice terraces.	4

Fig. 38. During the summer months supposedly,seedlings are 'drowned' by sudden torrential rain in Kiangan. (March 2024)

Fig. 39. An overwhelmed paddy embankment caused erosion of the terrace, destroying newly planted rice, Kiangan. (March 2024)

Key Value	Key Attributes Impacted	Top Hazards	Significant Factors [Impacts to date, physical exposure (E) and sensitivity (S), social and economic factors of vulnerabilities(V)]	Potential Impact*
TANUD (Economic, food source, employment)	Tourism (and all related industries)	• Prolonged drought • Intense tropical cyclones • Increased precipitation, and • Shifting weather patterns	**Exposure** • The tourism industry in the Ifugao rice terraces is exposed to all key climate hazards. • They disrupt tourism activities, infrastructure, and natural landscapes, impacting visitor experience and the overall tourism economy. **Sensitivity** • The tourism industry is highly sensitive to changes in weather patterns, with prolonged drought affecting water availability, landscape aesthetics, and outdoor activities such as trekking and sightseeing. • Intense tropical cyclones and increased precipitation can lead to landslides, road closures, and damage to cultural heritage sites, hindering tourist access and safety. Drought also affects the aesthetics of the terraces. **Vulnerability** • High vulnerability due to its reliance on natural landscapes, cultural heritage, and outdoor activities, all of which are susceptible to climate-related disruptions. • Drought-induced water scarcity, cyclone damage, and unpredictable weather patterns can lead to declines in tourist numbers, revenues, and livelihoods for local communities dependent on tourism. • Adaptive measures such as infrastructure improvements, climate-resilient planning, and diversification of tourism offerings are essential for enhancing the resilience of the tourism industry in the Ifugao rice terraces to climate change impacts.	**4**
KI-OHAAN (Socio-cultural solidarity)	Community work groups *(Pun-babaddangan)*	• Prolonged drought • Intense tropical cyclones • Increased precipitation • shifting weather patterns	**Exposure** • Community work groups are exposed to various climate hazards as these can affect the availability of water for agricultural activities, damage infrastructure such as irrigation systems and terraced landscapes, and disrupt traditional farming practices. **Sensitivity** • Community work groups are highly sensitive to changes in weather patterns, as their livelihoods depend on agricultural activities that are directly impacted by climate variability. • Prolonged drought can lead to water shortages, reduced crop yields, and food insecurity, while intense tropical cyclones and increased precipitation can cause soil erosion, landslides, and crop damage, affecting agricultural productivity. **Vulnerability** • High vulnerability. Work groups are dependent on weather-sensitive agricultural practices and have limited adaptive capacity. • Drought-induced crop failures, cyclone damage, and erratic weather patterns can exacerbate food insecurity, livelihood losses, and economic hardships for local communities. • However, these values are positively strengthened in times of weather disturbances, because communities band together in these times. Community resilience, cooperation, and traditional knowledge play crucial roles in mitigating the impacts of climate change on agricultural livelihoods.	**2**

Key Value	Key Attributes Impacted	Top Hazards	Significant Factors [Impacts to date, physical exposure (E) and sensitivity (S), social and economic factors of vulnerabilities(V)]	Potential Impact*
KI-OHAAN (Socio-cultural solidarity)	Traditional community rituals	• Prolonged drought • Intense tropical cyclones • Increased precipitation • shifting weather patterns	**Exposure** • Moderate exposure to climate hazards. • These rituals are often performed at specific times during the agricultural calendar, which may be disrupted by unpredictable weather events, leading to challenges in conducting the rituals effectively. **Sensitivity** • Traditional rice rituals are highly sensitive to changes in weather patterns, as they are deeply intertwined with agricultural practices and the natural environment. Prolonged drought can affect the timing of rituals related to planting and harvesting, while intense tropical cyclones and increased precipitation may disrupt the ceremonial processes associated with these rituals. **Vulnerability:** • High due to their reliance on favorable weather conditions for successful implementation. • Drought-induced crop failures, cyclone damage, and erratic weather patterns can disrupt the cultural significance and effectiveness of these rituals, affecting the spiritual and social cohesion of the community. However, the resilience and adaptability of traditional knowledge systems may help mitigate some of these vulnerabilities by allowing for adjustments in ritual practices to accommodate changing environmental conditions.	3
	Modern community festivals	• Prolonged drought • Intense tropical cyclones • Increased precipitation • shifting weather patterns	**Exposure** • Modern community festivals in the Ifugao province are exposed to climate hazards such as prolonged drought, intense tropical cyclones, increased precipitation, and shifting weather patterns. • These festivals often involve outdoor activities and large gatherings, making them susceptible to disruptions caused by extreme weather events. **Sensitivity** • Highly sensitive to changes in weather patterns, as they rely on favorable conditions for successful organization and participation. • Prolonged drought can impact the availability of water for ceremonial purposes and affect the overall atmosphere of the festival. Intense tropical cyclones and increased precipitation may lead to safety concerns and logistical challenges. **Vulnerability** • The vulnerability of modern community festivals to climate hazards is heightened due to their reliance on stable weather conditions for successful execution. • Climate-related impacts such as drought-induced water shortages, cyclone damage to infrastructure, and unpredictable weather patterns can disrupt festival activities, leading to financial losses and disappointment among participants. • However, proactive planning and adaptation measures, such as contingency plans for adverse weather conditions and flexible event schedules, may help mitigate some of these vulnerabilities and ensure the resilience of modern community festivals in the face of climate change.	3

Key Value	Key Attributes Impacted	Top Hazards	Significant Factors [Impacts to date, physical exposure (E) and sensitivity (S), social and economic factors of vulnerabilities(V)]	Potential Impact*
TUGUN (Indigenous knowledge systems and practices)	Custom law/ values/ philosophy/ morals *(Pangat di aammod)*	• Prolonged drought • Intense tropical cyclones • Increased precipitation • shifting weather patterns	**Exposure:** • Custom laws, values, philosophy, and morals in the Ifugao terraces are exposed to climate hazards. • These cultural aspects are deeply intertwined with agricultural practices and community livelihoods, making them susceptible to disruptions caused by extreme weather events. **Sensitivity:** • Custom laws, values, philosophy, and morals are highly sensitive to changes in weather patterns, as they influence decision-making processes and resource management strategies in the terraces. • Prolonged drought can challenge traditional water management systems and impact cultural rituals tied to agricultural cycles, while intense tropical cyclones and increased precipitation may lead to conflicts over land use and resource allocation. **Vulnerability:** • The vulnerability of custom laws, values, philosophy, and morals to climate hazards is heightened due to their integral role in shaping community identity and resilience. • Climate-related impacts such as crop failures, soil erosion, and damage to cultural heritage sites can undermine the integrity of these cultural aspects, leading to social unrest and loss of traditional knowledge. • However, efforts to integrate traditional wisdom with modern adaptation strategies and promote community engagement in climate resilience initiatives may help mitigate some of these vulnerabilities and foster the preservation of Ifugao cultural heritage in the face of climate change.	**2**
	Agricultural knowledge including rice farming and swiddening *(Punliyak/ Punpayo)*	• Prolonged drought • Intense tropical cyclones • Increased precipitation • shifting weather patterns	**Exposure** • Agricultural knowledge, including traditional rice farming and swidden farming practices in the Ifugao terraces, is exposed to climate hazards as these farming practices rely on specific environmental conditions and seasonal patterns, making them vulnerable to disruptions caused by extreme weather events. **Sensitivity** • Traditional rice farming and swidden farming techniques are highly sensitive to changes in weather patterns, as they require specific conditions for successful cultivation. • Prolonged drought can lead to water scarcity and reduced crop yields, while intense tropical cyclones and increased precipitation may cause soil erosion and damage to crops, affecting agricultural productivity and food security. **Vulnerability** • Indigenous agricultural knowledge is vulnerable to the impacts of climate change. Crop failures, diminished soil fertility, and biodiversity loss can undermine the effectiveness of traditional farming, exacerbating economic and social instability. Nonetheless, integrating traditional knowledge with modern agricultural techniques and promoting sustainable farming methods may offer solutions to mitigate these vulnerabilities and bolster the resilience of agricultural communities amidst changing environmental conditions	**3**

Key Value	Key Attributes Impacted	Top Hazards	Significant Factors [Impacts to date, physical exposure (E) and sensitivity (S), social and economic factors of vulnerabilities(V)]	Potential Impact*
TUGUN (Indigenous knowledge systems and practices)	Forest and Natural Resource Management *(Punmuyung)*	• Prolonged drought • Intense tropical cyclones • Increased precipitation • shifting weather patterns	**Exposure** • Forests and traditional natural resource management practices in the Ifugao terraces are vulnerable to disturbances caused by extreme weather events, which can lead to changes in forest composition, biodiversity loss, and habitat degradation. **Sensitivity** • Forest ecosystems and traditional resource management practices are highly sensitive to changes in weather patterns, as they rely on specific climatic conditions for their maintenance, regeneration, growth, and sustainability. • Prolonged drought can lead to water stress, reduced soil moisture, and increased susceptibility to forest fires, while intense tropical cyclones and increased precipitation may cause soil erosion and landslides affecting forest health and ecosystem functions. **Vulnerability** • Climate-related impacts such as forest degradation, loss of biodiversity, and disruption of ecosystem services can undermine the resilience of local communities and their ability to sustainably manage natural resources. • However, integrating traditional knowledge with modern conservation strategies and promoting community-based forest management initiatives may help mitigate some of these vulnerabilities and enhance the adaptive capacity of forest ecosystems to climate change.	**2**
	Indigenous belief system, *baki* rituals, *Hudhud*, *Punnuk* and other rice rituals, the *tonak* institution, etc.	• Prolonged drought • Intense tropical cyclones • Increased precipitation • shifting weather patterns	**Exposure** • Ifugao indigenous belief systems, practices rituals and traditional institutions are exposed, as climate events can disrupt the timing and efficacy of traditional rituals and ceremonies, impacting the spiritual and cultural practices deeply intertwined with the agricultural calendar. **Sensitivity** • The complex indigenous belief system and rituals are highly sensitive to changes in weather patterns, as they are deeply connected to the natural cycles and ecological cues for agricultural activities. • Prolonged drought may affect the timing of rituals associated with planting and harvesting, while intense tropical cyclones and increased precipitation can disrupt the conduct of ceremonies and gatherings. **Vulnerability** • The vulnerability of indigenous belief systems and rituals lies in their dependency on predictable weather conditions for meaningful observance and effectiveness. For example, the UNESCO-listed ICH *Punnuk* water tugging ritual takes place in the river. Several times, it had to be postponed or even canceled due to the strong and perilous current caused by heavy rains or a recent typhoon. Climate-related disturbances can challenge the continuity of traditional practices, potentially leading to a loss of cultural heritage and weakened community cohesion. • Incorporating climate-resilient practices into traditional rituals and ceremonies, such as modifying planting schedules to align with shifting weather patterns or implementing water conservation measures during droughts, can strengthen the resilience of these cultural traditions to climate change. Additionally, supporting community-led projects aimed at preserving indigenous knowledge and practices, such as documenting traditional agricultural techniques or revitalizing seed saving initiatives, can further enhance resilience by ensuring the continuity and adaptability of these cultural elements in the face of environmental challenges.	**3**

7.5. Results of Past Studies

In the Rice Terraces of the Philippine Cordilleras, extreme events such as tropical cyclones, floods and droughts have led to lower agricultural productivity and more frequent terrace collapse and landslides (Soriano et al, 2017, see Fig. 40). However, slow onset events such as increasing temperatures, land and forest degradation, and biodiversity loss have also affected the fragile ecological balance in the landscape, causing the decline in forest quality, soil degradation and increased pest occurrence.

It is worth noting that these physical impacts are further aggravated by existing social issues, particularly the loss of traditional knowledge and declining practice of key traditions because of disinterest from younger generations, as well as fewer number of farmers per household, which severely limit the adaptive capacity of local communities in the Ifugao Rice Terraces (Ducusin et al, 2019).

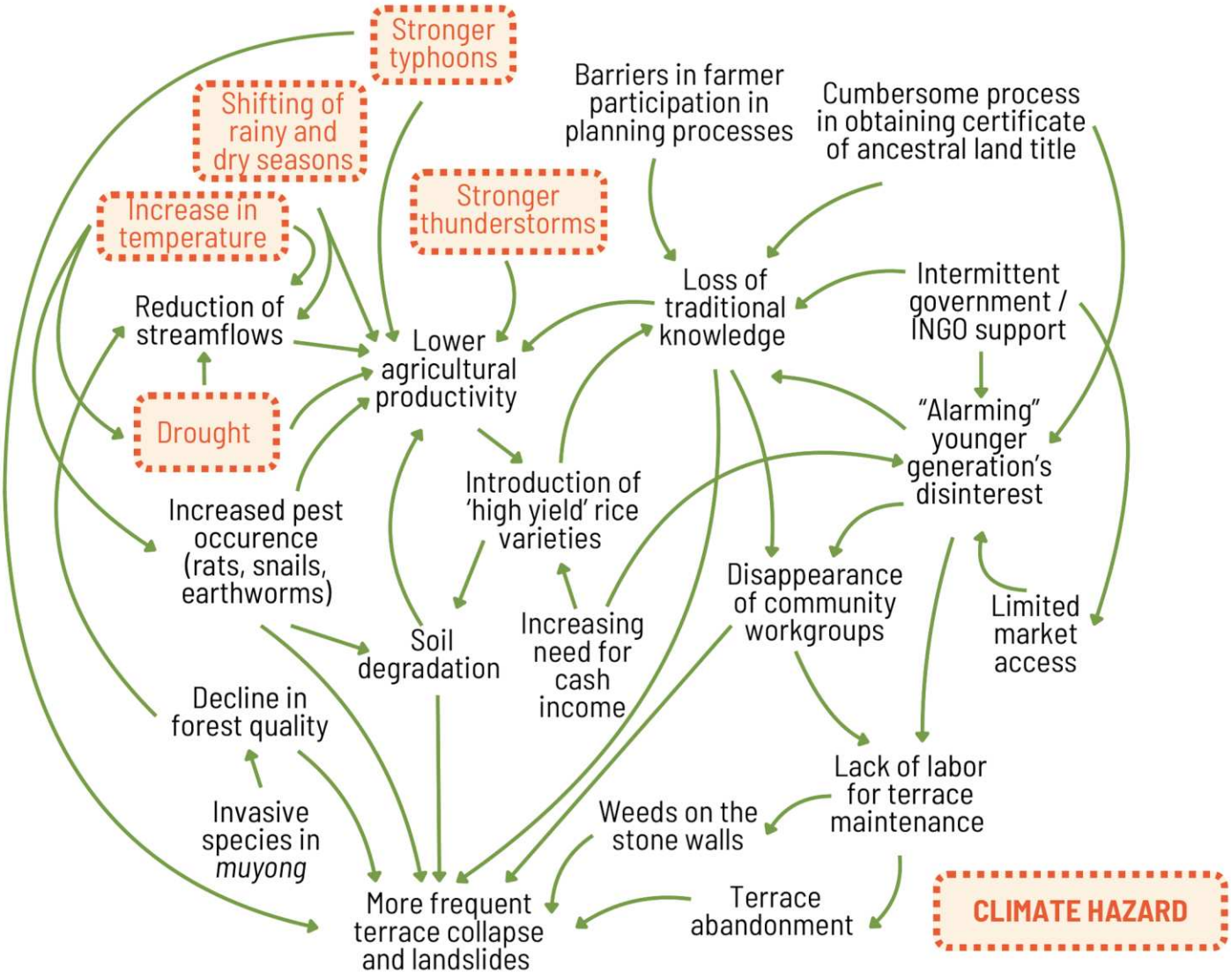


Fig. 40. Observed changes and projected challenge in Ifugao Rice Terraces. (Adopted from Soriano et al, 2017)

The Ifugao Risk Resiliency Roadmap and Investment Portfolio (2023) have similar findings to Soriano et al. It also examined the potential future impacts of climate change on the agricultural areas (Fig. 41) and mountainous/upland areas (Fig. 42) within the Ifugao Province. Overall, for agricultural areas in Ifugao, climate change can lead to a higher incidence of poverty and inequality due to reduced income and loss of livelihood for rain-dependent farming households; loss of capital for investors/farmers; increased prices of vegetables and fruits; food security issue; additional costs of rehabilitation and repair for owners and the government; and decline in local economic growth.

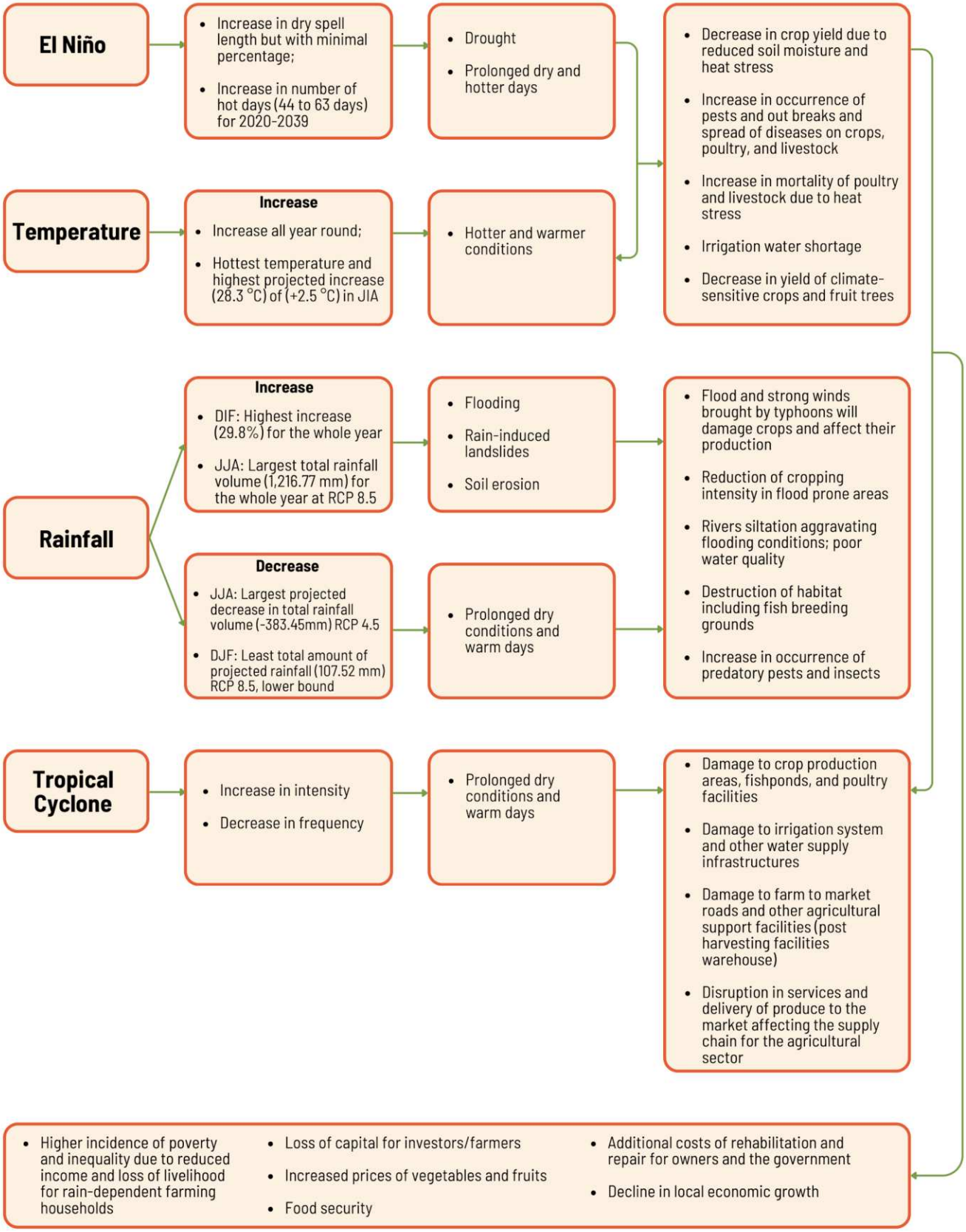


Fig. 41: Impact chain for agricultural areas in Ifugao Province. (Source: Ifugao Risk Resiliency Roadmap and Investment Portfolio, 2023)

Meanwhile, for mountainous/upland areas in Ifugao, climate change can lead to a decline in productivity of the forest ecosystem; biodiversity loss; increase in human health risks due to pests and invasive species; higher rates of mortality, morbidity and malnutrition for inaccessible, remote, far-flung barangays; reduced supply of water due to watershed degradation; and increase in poverty and inequality due to loss of shelter and livelihood for upland farming households.

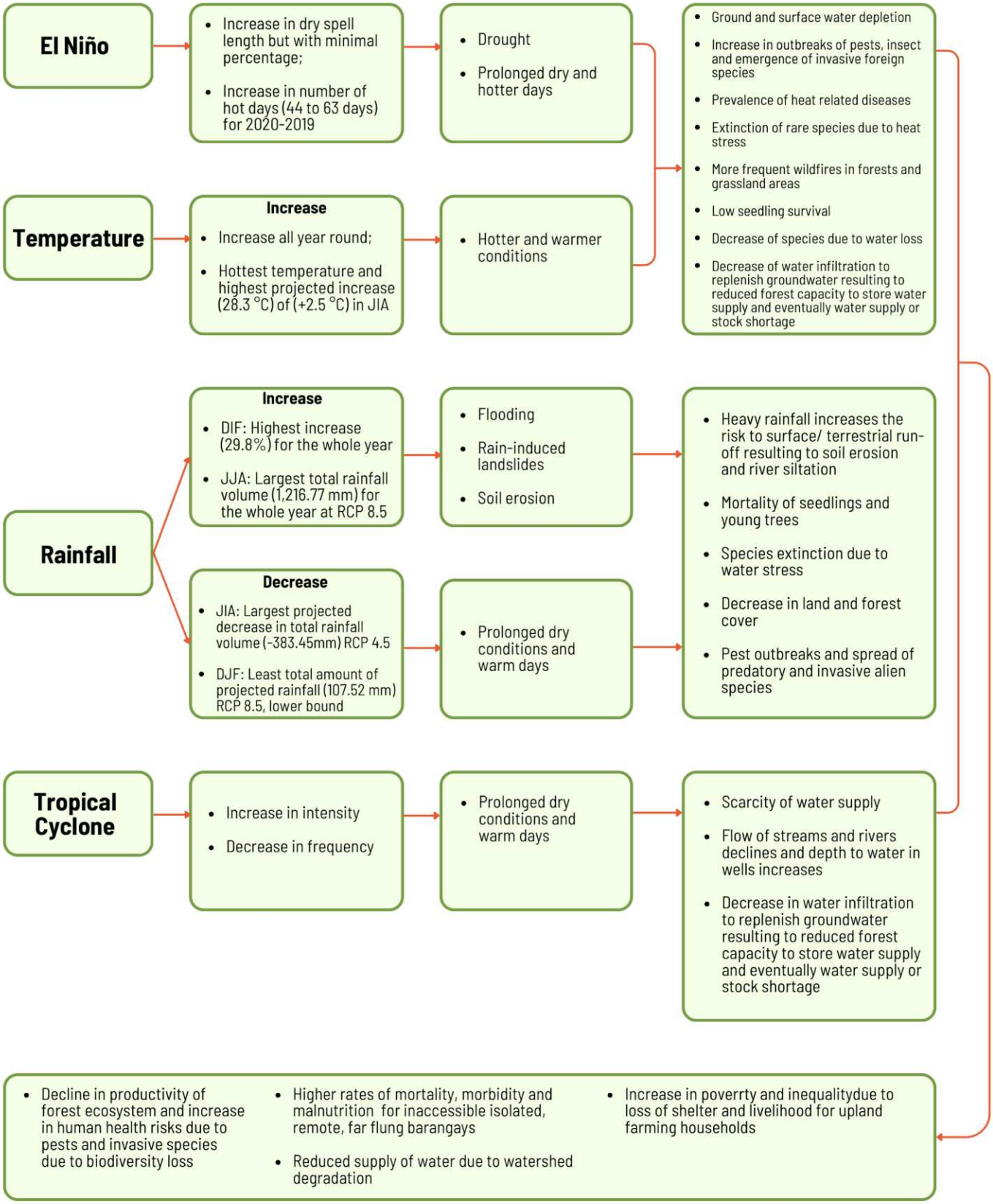


Fig. 42. Impact chain for mountainous/upland areas in Ifugao Province. (Source: Ifugao Risk Resiliency Roadmap and Investment Portfolio, 2023)

VIII. Community Climate Actions and Local Conservation Capacities

Chapter VIII

Local communities, especially farmers, are at the forefront of unpredictable weather and more frequent and severe natural disasters. In light of these challenges, Ifugao communities are harnessing their traditional knowledge and collective practices to devise adaptive strategies to mitigate the adverse effects of climate change on their livelihoods and cultural heritage. Moreover, they have a growing recognition of how important collaboration between local communities and government agencies is in addressing climate-related issues. That collaboration facilitates the exchange of information, resources, and expertise, and allows for more effective adaptation and response. Furthermore, it signifies a shift towards a more inclusive and participatory approach to climate resilience, where local voices and perspectives are integrated into policymaking processes and development initiatives. As a result, community-led initiatives are complemented by government support and services, enhancing the overall resilience of the rice terraces ecosystem to climate change impacts.

For generations, Ifugao farmers have cultivated the terraces using sustainable agricultural practices that prioritize soil fertility, efficient water management, and crop diversity. These time-tested methods not only enhance resilience to climate variability but also safeguard the ecological integrity of the terraces. Additionally, local communities are actively engaging in collective action to conserve natural resources, restore degraded areas, and promote biodiversity conservation. Central to these efforts is the principle of collective action and close collaboration to address common challenges to safeguard their environment.

Moreover, Ifugao people advocate for integrating indigenous knowledge systems into climate change policy and decision-making processes, emphasizing the importance of respecting local experiences alongside scientific insights. By fostering collaborative partnerships between people and government, and embracing community-driven initiatives, the rice terraces of the Ifugao province can more effectively meet the complexities of climate change while preserving their cultural heritage and sustainable way of life.

During the community workshops, participants were asked what they can do as individuals or as a community to address existing and potential climate change issues. Their responses indicate an awareness of climate change-related risks and hazards, likely from having experienced these issues in the previous years. They also have a clear understanding of risk reduction, mitigation and adaptation. Most of the answers are straightforward and reflect the reality beyond theoretical actions at the community level.

8.1 Participant Responses to Climate Actions

Risk/Hazard	Affected Value/s	Affected Attributes	Community Climate Actions/Solution	
			Short-term	Long-term
Too much water in the terraces due to typhoon, strong rains or thunderstorms	***Tawid*** (Heritage value) ***Tanud*** (Economic value)	Rice terraces, rice and other crops	• Adjustment of pond field waterways (*alak, guhing*)	• Regular maintenance of canals and waterways using community cooperation system [1]; • performance of rituals to appease weather gods [2]
Landslides or erosion of terraced walls due to too much rain or too much sun	***Tawid*** (Heritage value)	Rice terraces walls	• Repair eroded walls through community (*baddang*) (Fig. 42) cooperation; • The local government and other agencies provide assistance.	• Bench terracing/ stonewalling terraces must be properly done through traditional techniques [3]

Risk/Hazard	Affected Value/s	Affected Attributes	Community Climate Actions/Solution	
			Short-term	Long-term
Not enough water in the terraces due to prolonged drought	***Tawid*** (Heritage value)	Rice terraces	• "Follow the water", most streams and rivers in the highlands never dry out. • During drought periods, adjustments in the irrigation canals need to be made to allow water to flow to the terraces.	• Maintenance of irrigation systems and seeking out alternative sources of water; • Ask for assistance from the barangay and municipal government.
Mortality of crop seedlings due to typhoon or unpredictability of weather patterns	***Tanud*** (Economic value)	Rice crops	• Sharing of seedlings to those who have lost theirs;	• Increase amount of seeds for germination for future purposes to increase chances of survival; • Plant sturdier varieties if there is forecast of el niño; • Ask for help from the agriculture office.
Crop failure in the terraces due to extended drought	***Tanud*** (Economic value)	Rice crops, village households	• Use secondary sources of food like the *muyung* or *habal* (ago-forest or swidden farm); • Sell handicrafts • Borrow rice from unaffected relatives	• "Maintain and strengthen kinship and community bonds because you can count on them in times of hardship." • Develop secondary income source
Increase in pests that destroys rice crops	***Tanud*** (Economic value) ***Tugun*** (IKSP/ Knowledge value)	Rice and other food sources in the swidden farms	• Use pesticides (organic or synthetic); • The municipal agriculture office can also provide assistance.	• Maintain or resurrect the performance of pest protection rituals; *"holok"* [3]; (Fig. 43) • Ask the local gov't for training on pest control. • Research on pest control by predators
Depletion/destruction of forest cover or resources due to typhoons and other weather events	***Tawid*** (Heritage value) ***Tanud*** (Economic value)	*Muyung* (Forests)	• Refrain from harvesting to allow natural regeneration	• Maintain customary laws on forest protection and maintenance; • DENR provides reforestation projects.
Destruction of homes during typhoons	***Tawid*** (Heritage value)	*Boble* (Village)	• Pre-emptive evacuation; Evacuate to village hall, school buildings or relatives' homes	• Build homes with concrete and steel [4]

[1] There is a traditional practice called *"mamaluk"* in some Ifugao areas where men of the village contribute resources (food and materials) and manpower to fix and maintain the irrigation system.
[2] Ifugaos have gods prayed to for good weather, for sun or rain or keep the village safe from devastating typhoons.
[3] *Munbanong* and *muntuping* are traditional construction techniques in terraced fields.
[4] Changing traditional construction materials to modern ones to address climate issues usually puts heritage communities in conflict with conservation agencies.

Fig. 43. Baddang, community cooperative labor. Rice terraces farmers from Nagacadan, Kiangan offer helping hands during the reconstruction of eroded rice paddies in Batad, Banaue. (Source: SITMo, 2012)

Fig. 44. *Dog-al*, protection ritual against pests in the fields and laziness in the village

8.2 Government Conservation Capacities

The Philippines passed the Climate Change Act of 2009 as the country's commitment to improve community resilience to climate risks and hazards. The Act states that it shall be the policy of the State to enjoin the participation of national and local governments, businesses, NGOs, local communities and the public to prevent and reduce the adverse impacts of climate change, among others. Section 14 of the said law states that Local Government Units shall be the frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas, consistent with the provisions of other laws, the National Climate Change Action (NCCA) Plan and the Framework. The Framework adopts Philippine Agenda 21 for Sustainable Development, to fulfill human needs while maintaining the quality of the natural environment for current and future generations. The NCCA Plan also aims to foster awareness and build adaptive capacity of local communities, increase resilience of the natural ecosystems to climate change and optimize mitigating opportunities towards sustainable development.

The Local Government of Ifugao plays a pivotal role in safeguarding the integrity and sustainability of the terraces and uses existing legislative measures to protect and preserve this UNESCO World Heritage Site. Such regulations include land use regulations and zoning ordinances, designed to mitigate threats of urban encroachment, deforestation, and unsustainable agricultural practices. Furthermore, recognizing the existential threat posed by climate change to the rice terraces and the communities reliant upon them, the Local Government of Ifugao has proactively developed and implemented a comprehensive climate change action plan. This plan integrates scientific research, traditional knowledge systems, and community engagement to address the multifaceted challenges posed by a changing climate while ensuring the resilience and sustainability of the rice terraces ecosystem.

The Key Strategic Priorities include the following:

- Food Security
- Water Sufficiency
- Ecosystem Resilience and Environmental Stability
- Human Security
- Climate-smart Industries and Services
- Sustainable Energy
- Knowledge and Capacity Development

Expected Output

The key climate change strategies aim to achieve several outcomes:

- They seek to ensure the availability, stability, accessibility, and affordability of safe and healthy food in the face of climate change challenges.
- They aim to sustainably manage water resources, ensuring equitable distribution and accessibility to all.
- Enhance the adaptive capacity of communities, bolster the resilience of natural ecosystems, and promote sustainability in built environments against climate change impacts.
- Reduce the risks posed by climate change and disasters to the populace.
- Foster the development, promotion, and sustainability of climate-resilient, eco-efficient, and environment-friendly industries and services, including adaptive housing and land use development.
- Ensure adequate, reliable, and affordable power supply in areas like Ifugao.
- Enhance knowledge and build capacity to effectively address climate change challenges.

Indicators

The indicators encompass various aspects of climate change resilience and adaptation efforts. These include:

- Conducting province-wide vulnerability and risk assessments in the agriculture and fishery sector
- Establishing databases and conducting studies on agriculture and fishery
- Implementing agricultural technologies, programs, and policies supporting climate change adaptation and mitigation
- Providing appropriate training to farmers for alternative livelihood activities.
- Reviewing and harmonizing water resources management laws and policies
- Ensuring access to safe water for households
- Developing and implementing strategies for ecosystem protection as well as disaster risk reduction and climate change adaptation measures.
- Capacity-building programs for climate-smart small to medium enterprises
- Creating livelihood opportunities in vulnerable communities
- Implementing land-use programs
- Establishing Ecological Solid Waste Management programs
- Fostering Public-Private Partnerships for power generation
- Promoting sustainable and green power generation
- Enhancing the training of personnel from local government units, partner agencies, and Civil Society Organizations on climate change concepts and resources.
- Development and utilization of Information, Education, and Communication materials on climate change, identification and establishment of climate change resources, and accessing climate change resource networks in collaboration with partner agencies and organizations.

Agencies Involved

The lead agencies:

- Provincial Local Government **(PLGU)**
- Municipal Local Governments **(MLGUs)**

Coordinating agencies:

- Department of Agriculture - Cordillera Administrative Region **(DA-CAR)**
- Bureau of Fisheries and Aquatic Resources **(BFAR)**
- Climate Change Commission **(CCC)**
- Department of Science and Technology **(DOST)**
- Department of Social Welfare and Development **(DSWD)**

These agencies collaborate with to below agencies to implement climate change strategies and initiatives at the provincial and municipal levels.

- National Irrigation Administration **(NIA)**
- Department of Environment and Natural Resources **(DENR)**
- Department of Health **(DOH)**
- Department of Public Works and Highways **(DPWH)**
- Department of Trade and Industry **(DTI)**
- Department of the Interior and Local Government **(DILG)**
- Department of Education **(DEPED)**
- Commission on Higher Education **(CHED)**
- Department of Labor and Employment **(DOLE)**
- Technical Education and Skills Development Authority **(TESDA)**

Source: Province of Ifugao Climate Change Action Plan 2023-2027

Assessment of Adaptive Capacities

The adaptive capacity of the Ifugao rice terraces lies in its network of traditional knowledge, community resilience, and government support. Practices of sustainable land management and agricultural techniques are already part of adaptive capacities that are rooted in tradition. Through generations of experience, Ifugao farmers have developed nuanced and effective systems of water management, soil conservation, and crop diversification, which allows effective navigation around the impacts of climate change. Moreover, the strong community solidarity and action practiced by local inhabitants reinforces climate resilience because they share resources, knowledge, and labor during times of need. Legislative measures, climate action plans, and government services provide crucial support and resources to bolster community-led adaptation efforts, ensuring a more holistic and coordinated approach to climate resilience. Overall, the Ifugao rice terraces demonstrate a commendable adaptive capacity, characterized by the integration of traditional wisdom, community cohesion, and government support laying a strong foundation for sustainable adaptation to future climate challenges.

The climate adaptive capacity is underpinned by several key components:

1. Traditional Knowledge and Practices
Ifugao farmers possess a wealth of traditional knowledge on sustainable agricultural techniques, water management systems, and soil conservation methods received from past generations. Honed over centuries of experience, form the backbone of the terraces' resilience to climate variability.

2. Community Resilience and Solidarity
The strong Ifugao sense of community cohesion and solidarity is pivotal in enhancing adaptive capacity. Communities work together to share resources, knowledge, and labor, enabling them to collectively respond to and recover from climate-related challenges.

3. Government Support and Collaboration
The active engagement and collaboration between local communities and government agencies further strengthen the adaptive capacity of the rice terraces. Legislative measures, climate action plans, and government services provide crucial support and resources to bolster community-led adaptation efforts.

- **Legislative Measures:** Legislative measures enacted by the local government contribute to the protection and preservation of the rice terraces, safeguarding them from potential climate impacts.
- **Climate Action Plans** outline strategies for mitigating and adapting to climate change, guiding government interventions and community initiatives.

4. Integrated Approach to Climate Resilience
The integration of traditional wisdom, community cohesion, and government support facilitates a holistic and coordinated approach to climate resilience in the Ifugao rice terraces. By leveraging diverse resources and expertise, stakeholders work collaboratively to address climate-related challenges and build a more resilient future.

Collectively these components contribute to the adaptive capacity of the Ifugao rice terraces, enabling them to withstand and thrive amidst changing environmental conditions. However, the effectiveness of any system, no matter how robust, is tethered to the sudden and unforeseen climatic shifts. Implementing well-crafted government plans is contingent on factors like resource allocation and bureaucratic efficacy, which are weak areas of the system. Additionally, the fidelity of communities to the time-honored teachings of their ancestors, is subject to the evolving dynamics of modernity. In the face of these uncertainties, the Ifugao rice terraces stand as a poignant reminder that adaptation is an ongoing journey, and the synergy between tradition, community, and governance must persistently evolve to navigate the unpredictable path that climate change lays before them.

The table below depicts the comprehensive assessment of adaptive capacity and associated risks from climate change concerning key values of the Ifugao rice terraces. The adaptive capacity is graded on a scale from none to high, while the risk from climate change is rated from none to extreme.

Adaptive Capacity

HIGH
MEDIUM
LOW
NONE

Risk from Climate Change

NONE
LOW
MODERATE
EXTREME

Key Value	Top Hazards	Potential Impact	Adaptive Capacity (refer to legend above for details) *(High, Medium, Low)*		Risk from Climate Change
TAWID (Heritage Value)	• Intensified typhoons and thunderstorms; • Excessive rainfall • Shifting weather patterns	3 (MODERATE)	Community Activities Conservation Activities Learning from the Past	HIGH MEDIUM HIGH	3 (MODERATE)
	• Drought	3 (MODERATE)	Community Activities Conservation Activities Learning from the Past	MEDIUM MEDIUM HIGH	3 (MODERATE)
TANUD (Economic Value)	• Intensified typhoons and thunderstorms; • Excessive rainfall • Shifting weather patterns	4 (EXTREME)	Community Activities Conservation Activities Learning from the Past	HIGH HIGH HIGH	3 (MODERATE)
	• Drought	4 (EXTREME)	Community Activities Conservation Activities Learning from the Past	HIGH HIGH HIGH	3 (MODERATE)
KI-OHAAN (Socio-cultural solidarity)	• Intensified typhoons and thunderstorms; • Excessive rainfall • Shifting weather patterns • Drought	3 (MODERATE)	Community Activities Conservation Activities Learning from the Past	HIGH HIGH HIGH	3 (MODERATE)
TUGUN (IKSP/ Traditional knowledge value)	• Intensified typhoons and thunderstorms; • Excessive rainfall • Shifting weather patterns • Drought	3 (MODERATE)	Community Activities Conservation Activities Learning from the Past	HIGH MEDIUM HIGH	3 (MODERATE)

IX. Conclusion and Recommendations

Chapter IX

The Ifugao Rice Terraces stand as a testament to centuries of indigenous agricultural practices and cultural heritage. This cultural landscape is not immune to the manifestations of climate change: intensified typhoons, thunderstorms, erratic precipitation patterns, and prolonged droughts. These environmental stressors pose imminent risks, including soil erosion, landslides, crop loss, and structural damage to the terraces, threatening both their ecological integrity and agricultural productivity.

The terraced landscape, with its traditional farming methods linked to ecological cues, exhibits a high sensitivity to the disruptions caused by climate variability. Furthermore, the hydrological management system of the terraces is finely tuned to precipitation patterns, influencing water distribution and retention in the fields.

The vulnerability of the Ifugao Rice Terraces is rooted in their reliance on traditional agricultural practices and their interconnectedness with the natural environment. Climate hazards translate into reduced crop yields, economic hardship for farmers, and food insecurity among communities dependent on terrace farming. Concurrently, extreme weather events may compromise the structural integrity of the terraces, amplifying vulnerability and jeopardizing the sustainability of this cultural landscape. Despite this, and with the backbone of its traditional values and indigenous knowledge systems, the terraces and its people are moderately resilient.

Rooted in indigenous wisdom, the rice terraces have evolved to cope with changing environmental conditions and emerged as a self-sustaining conservation system. This agricultural monument is not merely a static landscape but a dynamic system endowed with built-in mechanisms designed to address environmental challenges. The values attached to its maintenance—heritage, economic sustainability, community solidarity, and the perpetuation of indigenous knowledge—form the bedrock of this resilience.

The heritage value impels the community to preserve the terraces as a testament to their rich cultural legacy and in honor of their ancestors. Simultaneously, the economic value motivates sustainable farming practices, ensuring the terraces remain productive for future generations. The sense of community solidarity fosters collective efforts in terrace maintenance and environmental conservation. Importantly, the indigenous knowledge embodied by terrace farming continues to evolve as people encounter new environmental dynamics, thereby ensuring that the system adapts to contemporary challenges.

In essence, the Ifugao rice terraces represent a harmonious interplay between tradition, adaptability, and conservation ethos. The terraces have an exemplary role in the preservation of cultural and ecological heritage in the face of a changing climate.

In summary, the Ifugao Rice Terraces confront a complex web of climate challenges. Although their traditional values, and indigenous knowledge systems give them the advantage of resilience, they need government funding, infrastructure development, and technical capacity to develop more robust adaptive strategies and sustainable management practices. It is only by this collaboration that the Ifugao can most extensively preserve their ecological resilience and secure the livelihoods of the communities that call the terraces home.

9.1.3 On Adaptive Capacity

Their adaptive capacity is influenced by various factors, including indigenous knowledge, community values, government support, and collaboration between communities and their local government.

INDIGENOUS KNOWLEDGE
Indigenous knowledge plays a crucial role in the adaptive capacity of the Ifugao rice terraces. Traditional agricultural practices, such as terrace construction, water management techniques, and crop selection, are informed by centuries of experience and observation of the natural environment. This indigenous knowledge enables communities to adapt their farming practices to changing climatic conditions, such as shifting precipitation patterns or prolonged droughts.

COMMUNITY VALUES
The communal ethos and strong sense of solidarity among Ifugao communities contribute to their adaptive capacity. Community members work together to address common challenges, share resources, and collectively manage the terraced landscape. This collaborative approach fosters resilience and enables communities to respond effectively to climate-related disruptions. Moreover, the cultural significance of the rice terraces as a symbol of identity and heritage motivates community members to protect and preserve this cultural landscape for future generations.

GOVERNMENT SUPPORT
Government support plays a crucial role in enhancing the adaptive capacity. Policies and programs that recognize the cultural and ecological importance of the terraces, or fund conservation efforts and infrastructure development can strengthen the

community's climate resilience. Additionally, government agencies can provide technical assistance and capacity-building initiatives to help communities implement adaptive measures and sustainable land management practices.

COLLABORATIONS BETWEEEN COMMUNITIES AND LOCAL GOVERNMENT

This collaboration is essential for effective climate adaptation in the Ifugao rice terraces. By working together, communities and local government agencies can tailor climate adaptation plans that leverage traditional knowledge and modern interventions to meet local needs and priorities. This collaboration builds relationships, facilitates the exchange of knowledge and expertise, and fosters a sense of ownership and empowerment among community members.

9.2 Implications

9.2.1 Importance of Integrating Local Values and Indigenous Knowledge in Conservation Efforts

Local values and indigenous knowledge are deeply rooted in the Ifugao cultural identity and are intricately linked to traditional practices of terrace farming and ecosystem management. Both must be integrated into current conservation efforts to ensure that adaptation and mitigation strategies are culturally appropriate, socially acceptable, and environmentally sustainable. Additionally, this promotes community ownership and participation in conservation initiatives, which increases the sense of stewardship and responsibility for protecting the landscape. This holistic approach enhances the resilience of the rice terraces to climate change impacts and contributes to cultural heritage preservation and the well-being of local communities.

9.2.2 Significance of Community-led Initiative and the Need for Holistic Approaches

Community-led initiatives promote social cohesion, foster a sense of ownership and responsibility, and ensure that solutions are tailored to their specific needs. Therefore, such initiatives play a vital role in conservation and management, especially in the context of climate change. Local communities are often the first to observe and respond to changes in weather patterns and environmental conditions, and when empowered to lead conservation efforts, stakeholders can leverage their indigenous knowledge to develop context-specific adaptation and mitigation strategies.

9.3 Recommendations

Climate change poses complex challenges that require a holistic approach beyond community-level actions. Community-led initiatives must coalesce with broader, multi-stakeholder partnerships (government agencies, NGOs, academia, and other stakeholders) to coordinate efforts, mobilize resources, and implement comprehensive strategies that address the interconnected social, economic, and environmental dimensions of conservation. Only a multi-sectoral approach can sustainably enhance the resilience of the rice terraces and ensure their long-term sustainability in the face of climate change.

9.3.1 Immediate Priority Projects

- **Terrace Maintenance and Rehabilitation:** Implement regular maintenance programs to reinforce terrace walls, repair erosion, and enhance water management systems using traditional techniques supplemented by modern engineering methods where appropriate. Regular government-assisted maintenance and rehabilitation of terraces are imperative due to the escalating damages caused by climate change. Despite the critical need, such assistance is often irregular and contingent upon the availability of funds. With the frequency of extreme weather events on the rise, including intensified typhoons, excessive rainfall, and prolonged droughts, the terraces face heightened vulnerability to erosion, landslides, and waterlogging. These climatic impacts not only compromise the structural integrity of the terraces but also significantly increase labor costs for farmers, particularly in mitigating damages caused by landslides. This additional burden on farmers underscores the urgent need for consistent government support for terrace maintenance and rehabilitation, ensuring the long-term sustainability of the Ifugao terraces and alleviating financial strain on farming communities.

  Water Management Enhancements: Water management enhancements are crucial for adapting to changing precipitation patterns in the Ifugao terraces. By improving irrigation systems, such as adjusting canal networks and installing water storage facilities, the terraces can better withstand the impacts of both

drought and excess rainfall. Additionally, exploring alternative water sources can provide resilience against fluctuations in precipitation. One promising avenue is to learn from water conservation practices employed in other terrace sites across Southeast Asia. By studying successful strategies implemented in similar agro-ecological contexts, the Ifugao terraces can identify effective approaches for optimizing water usage and enhancing resilience to climate variability. Adapting proven methods from neighboring regions offers a valuable opportunity to strengthen water management practices in the Ifugao terraces, ensuring sustainable agriculture and livelihoods for local communities amidst evolving climatic conditions.

- **Crop Diversification and Resilient Varieties**: Encourage the cultivation of a wide range of crop varieties, including drought-resistant strains, to mitigate risks linked to unpredictable weather patterns. Preserve traditional rice varieties that have proven resilience, such as dry rice or "upland rice," as viable alternatives to wet rice varieties during periods of drought. Additionally, prioritize heirloom vegetable varieties, which have demonstrated climate resilience, over newly introduced options as supplemental food sources in the terraces. This approach not only diversifies agricultural production but also safeguards traditional knowledge and promotes sustainability in the face of changing climatic conditions.

- **Forest Conservation and Reforestation:** To bolster watershed management, prevent soil erosion, and safeguard biodiversity, it is imperative to protect and restore the surrounding forests, known as muyung. An important step involves institutionalizing the muyung forest management system through legislative measures to ensure its sustainability. By capitalizing on indigenous knowledge, these forests can be effectively and sustainably managed, yielding benefits for both the environment and local communities. However, existing Philippine laws classify Ifugao forests as public property, conflicting with Ifugao customary law, which mandates forest stewardship, maintenance, and upkeep by private families and the community. This dichotomy in land tenure often sparks friction between the State and the Ifugaos, frequently resulting in the abandonment of traditional forest practices. Addressing this discrepancy is vital for fostering harmony and preserving the invaluable ecosystem services provided by the muyung forests. (see *"Muyung"* on annex)

- **Community-Based Disaster Risk Reduction**: Strengthen community preparedness and response mechanisms for extreme weather events by establishing early warning systems, conducting drills, and designating evacuation routes and shelters.

- **Livelihood Diversification and Economic Resilience:** Support community-based livelihood diversification initiatives in eco-tourism, handicrafts, and sustainable forest products to reduce dependence on agriculture and enhance economic resilience.

9.3.2 Implement Sustainable Land Management Practices

The following recommendations are proposed, particularly among indigenous communities, learning institutions, local government, and pertinent national agencies (Department of Agriculture, National Commission for Culture and the Arts, Department of Public Works and Highways, National Commission on Indigenous Peoples, Department of Trade and Industry, Department of Tourism, etc.)

- **Foster Collaborative Partnerships:** Facilitate collaboration between local governments, civil society organizations, academia, and other stakeholders to leverage expertise, resources, and networks in support of community-led conservation efforts. Foster a culture of cooperation and mutual respect to ensure that diverse perspectives and interests are represented and integrated into conservation planning and decision-making processes.

  Mostly, agricultural and cultural policies are crafted and implemented predominantly in a top-down approach, which often fails to adequately address the unique needs of indigenous cultural communities. While national standards are crucial for ensuring consistency and efficiency across the board, the insistence on uniform policies can inadvertently sideline the distinct requirements of minority groups.

  Government should establish platforms for participatory decision-making processes, community meetings, consultation and collaboration to ensure that community voices are heard and considered in decision-making processes. Further, it should facilitate knowledge exchange between traditional practitioners, scientific experts and government. Create platforms for sharing traditional ecological knowledge, best practices, and innovations that have been passed down through generations.

Most national policies, crafted for the collective welfare, sometimes cannot address the distinct needs of indigenous cultural communities.

For example, in the 1970s, the International Rice Rearch Institute (IRRI) developed high-yield rice varieties. The Ginintuang Masagana Ani (golden harvest) program required it be planted in all rice-producing regions of the Philippines. Kiangan, the epicenter of Ifugao culture, became the first government laboratory in the highlands for these new High Yielding Rice Varieties (HYVs).

This hybrid rice would replace the tinawon, the celebrated Ifugao heirloom rice. The core of the Ifugao identity is their terraces, their tinawon rice, and all the traditions and belief systems centered on a bountiful harvest of that rice.
Annually, the hybrid rice could be harvested 2-3 times, as compared to the tinawon, or 'once-a-year-rice' as it derives its name from a single annual harvest.

Consequently, the highly nutritious tinawon rice completely disappeared in the Kiangan terraces within two years of HYV cultivation, and the rice rituals with it. Why? Because Ifugaos only perform the rituals on the tinawon variety. Traditional rice cycles, based on an annual harvest, were supplanted by 2-3 harvests a year. Continuous planting did not allow the land to fallow, so this depleted the soil fertility, which required synthetic fertilizers, and brought with it a new set of pests.

The single act of mandating the planting of the hybrid rice in the Ifugao rice terraces altered Indigenous knowledge in rice production, organic fertilizer development when they let the land lie fallow, communal labor during stages of sowing, reaping, pest control, and forest maintenance, which are all timed with the tinawon rice.
Therefore, there is a pressing need to reassess and reformulate agricultural and culture-related policies to embrace a more inclusive and participatory approach that respects and integrates the diverse perspectives and cultural contexts of all stakeholders involved.

- **Empower Local Institutions:** Support the capacity-building of local institutions, such as barangay councils and indigenous peoples' organizations, to effectively govern and manage natural resources. Provide training and resources to enhance their leadership, organizational, and management skills, enabling them to play a more active role in conservation efforts.

- **Implement Community-Based Natural Resource Management:** Promote the adoption of community-based natural resource management approaches, where local communities have the authority and responsibility to manage and protect their natural resources. This can include establishing community-managed conservation areas, implementing sustainable land use practices, and enforcing regulations to prevent illegal activities.

- **Strengthen Legal Frameworks:** Ensure that legal frameworks and policies support community-based conservation initiatives and recognize the rights of indigenous peoples to govern and manage their ancestral lands. Advocate for the implementation of laws that protect indigenous rights, land tenure, and customary land-use practices. While the Indigenous People's Right Act of 1977 provides for general rights, many of its provisions are not self-executory and need more specific legislation to be effective as a law. An example is the recognition of IP ancestral domains but without specifying whether forests are recognized as private property. Philippine forestry laws do not recognize IP ownership of forests and state that mountains are public lands and belong to the State.

- **Provide Financial and Technical Support:** Allocate resources and provide technical assistance to support community-led conservation projects and initiatives. This can include funding for capacity-building activities, infrastructure development, and sustainable livelihood programs that enhance local resilience and well-being. In fact, there should be a special financial subsidy to rice terraces farmers as custodians and caretakers of a World Heritage Site and a National Cultural Treasure, similar to the 4Ps.

9.3.3 Program Investing in Education and capacity-building programs

By investing in education and capacity-building programs tailored to the Ifugao rice terraces, we can empower local communities, strengthen indigenous knowledge systems, and foster collaborative efforts to adapt to climate change while preserving the cultural and ecological heritage of this UNESCO World Heritage Site.
Here are some recommendations on how to effectively implement such initiatives:

- **Enable Climate Literacy:** Schools Integrate climate change education into the Ifugao local school curricula or provide after school

programs to ensure that students at all levels understand the causes, impacts, and solutions to climate change. Develop educational materials that incorporate traditional ecological practices specific to the Ifugao rice terraces, highlighting the importance of environmental conservation and sustainable land management.

- **Local Leaders:** Provide training to local leaders, community organizers, and government officials in Ifugao to enhance knowledge of climate change and adaptation strategies. Offer workshops, seminars, and technical assistance programs that empower local stakeholders to lead climate resilience initiatives, mobilize resources, and facilitate community engagement in decision-making processes. Offer Vocational Training Programs for Sustainable Agriculture that focus on sustainable agriculture practices suited to the terraced landscape of Ifugao. Provide hands-on training in terrace farming techniques, water management, agroforestry, and organic farming methods that promote soil conservation, biodiversity conservation, and resilience to climate-related risks.

- **Indigenous Knowledge Exchange Platforms**: Facilitate traditional ecological knowledge exchange between indigenous communities in Ifugao and mainstream education systems. Establish platforms for dialogue and collaboration between local farmers, elders, researchers, and educators to integrate indigenous wisdom into formal education programs and promote cultural preservation alongside climate adaptation efforts.

- **Research and Innovation for Climate Resilience**: Support initiatives that generate context-specific knowledge, technologies, and solutions to address climate change challenges in the Ifugao rice terraces. Encourage interdisciplinary research on climate science, sustainable agriculture, and community-based adaptation strategies between local research institutions, government agencies, and international organizations. Launch public awareness campaigns in Ifugao that promote climate literacy, cultural heritage preservation, and community-based climate action. Utilize traditional and digital media platforms, cultural events, and community forums to disseminate information, raise awareness, and mobilize public support for climate resilience initiatives, highlighting the interconnectedness between cultural heritage conservation and environmental stewardship in the rice terraces

9.3.4 Program to Implement Sustainable Land Management Practices

It is essential to adopt a multifaceted approach that integrates traditional ecological knowledge, scientific expertise, community participation, and institutional support. Here are some key recommendations for the implementation of sustainable land management practices:

- **Encourage Intergenerational Learning and Knowledge** exchange between elders and younger generations to ensure the continuity of traditional practices and the adaptation of these practices to changing environmental conditions. Recognize and respect the indigenous knowledge systems of the Ifugao people regarding land use and management, terrace farming, and natural resource conservation.

- **Promote Agroecological Farming Methods:** that promote biodiversity, soil health, and water conservation in the rice terraces. This includes practices such as crop rotation, intercropping, agroforestry, and the use of organic fertilizers and biopesticides. Provide training and technical assistance to farmers on agroecological principles and techniques tailored to the specific agro-climatic conditions of the Ifugao region.

- **Implement Soil and Water Conservation Measures**, which prevent erosion, improve soil fertility, and enhance water efficiency in the rice terraces. This may include the construction of contour bunds, stone terraces, check dams, and vegetative buffer strips to stabilize slopes, retain soil moisture, and reduce sedimentation in waterways. Work closely with local communities to identify priority areas for conservation interventions and ensure their active participation in implementation and maintenance efforts.

- **Integrate Climate-Smart Agriculture Practices** into land management strategies to enhance resilience and variability. This includes promoting drought-tolerant crop varieties, water-saving irrigation techniques, weather forecasting and early warning systems, and adaptive land-use planning approaches that account for changing climate conditions and extreme weather events.

- **Strengthen Land Tenure and Governance Systems** to ensure equitable access to land and natural resources, promote land stewardship, and resolve conflicts over land use and management rights. Enhance the capacity of local institutions, government agencies, and community-based organizations to enforce land laws and regulations, facilitate land tenure regularization, and promote participatory decision-making processes that involve all relevant stakeholders.

- **Foster Collaboration and Partnerships** among government agencies, civil society organizations, academic institutions, and the private sector to pool resources, share knowledge, and coordinate efforts towards sustainable land management in the Ifugao rice terraces. Establish multi-stakeholder platforms, working groups, and joint initiatives that facilitate information exchange, collaborative research, and collective action on land conservation and restoration initiatives.

- **Monitor and Evaluate Impact Establish** robust monitoring and evaluation mechanisms to establish baselines and assess the impact of sustainable land management practices on soil health, water quality, biodiversity, and livelihood resilience in the rice terraces. Collect baseline data, set clear indicators and targets, and regularly monitor progress towards achieving sustainable land management goals. Use participatory approaches and community-based monitoring systems to engage local stakeholders in data collection, analysis, and decision-making processes.

By implementing these recommendations, we can promote the adoption of sustainable land management practices in the Ifugao rice terraces, protect the ecological integrity of this UNESCO World Heritage Site, and enhance the resilience of local communities to the impacts of climate change.

9.4 Call to Action

IIn our pursuit of climate resilience, it is imperative to acknowledge and harness the invaluable wisdom of Ifugao indigenous knowledge. The traditional practices and ecological insights passed down through generations hold the key to sustainable land management and climate adaptation in the Ifugao rice terraces.

Recognizing the Ifugao farmers as the true stewards of the terraces underscores the importance of collective action. Together, as a collective community, we can implement sustainable land management practices, strengthen resilience, and preserve the cultural and ecological heritage of the Ifugao rice terraces for future generations.

As a heritage of humanity, the conservation of the Ifugao rice terraces is not solely the responsibility of the Ifugao people. It requires the support and assistance of other stakeholders, including governments, policymakers, researchers, and conservation organizations. By working together in partnership and solidarity, we can ensure the continued protection and sustainable management of this iconic cultural landscape amidst the challenges of climate change.

- **Recognition of Indigenous Knowledge:** Acknowledge indigenous knowledge as a cornerstone of resilience-building in the face of climate change, leveraging traditional practices such as terrace maintenance rituals, traditional seed selection, and watershed management techniques.

- **Incorporation into Education:** Embed indigenous knowledge into educational curricula and community outreach programs to ensure the continuity of invaluable insights into terrace farming, water management, and natural resource conservation.

- **Youth Empowerment and Intergenerational Knowledge Exchange:** Empower young farmers and community leaders through tailored capacity-building programs, enabling them to adopt climate-resilient agricultural practices, sustainable land management techniques, and disaster risk reduction strategies. Foster platforms for intergenerational knowledge exchange, enabling the transfer of traditional ecological knowledge from elders to youth.

- **Climate Action Education:** Provide the youth with the requisite skills and knowledge to navigate the complexities of climate change, fostering a sense of stewardship and responsibility towards the Ifugao terraces.

- **Holistic Approach to Climate Action:** Emphasize a holistic approach to climate action by integrating

- indigenous knowledge systems alongside scientific innovations, thereby harnessing a deep understanding of cultural heritage and local context.

- **Safeguarding Sustainability:** Invest in intergenerational knowledge transfer and youth education as foundational pillars for safeguarding the sustainability and resilience of the Ifugao rice terraces.

- **Convergence of Traditional Wisdom and Modern Expertise:** Pave the way for a future where traditional wisdom and modern expertise converge to forge resilient communities capable of taking effective climate action amidst the uncertainties of a changing climate.

- **Terrace Maintenance and Rehabilitation:** Implement regular maintenance programs to reinforce terrace walls, repair erosion, and enhance water management systems using traditional techniques supplemented by modern engineering methods where appropriate.

- **Water Management Enhancements:** Improve irrigation systems to adapt to changing precipitation patterns by adjusting canal networks, installing water storage facilities, and exploring alternative water sources to mitigate the effects of drought or excess rainfall.

- **Crop Diversification and Resilient Varieties:** Promote the cultivation of diverse crop varieties, including drought-resistant strains, to mitigate risks associated with fluctuating weather conditions and preserve traditional rice varieties that have demonstrated resilience.

- **Forest Conservation and Reforestation:** Protect and restore surrounding forests (muyung) to enhance watershed management, prevent soil erosion, and maintain biodiversity, leveraging indigenous knowledge for sustainable forest management.

- **Community-Based Disaster Risk Reduction:** Strengthen community preparedness and response mechanisms for extreme weather events by establishing early warning systems, conducting drills, and designating evacuation routes and shelters.

- **Cultural Preservation and Knowledge Sharing:** Promote the preservation and transmission of indigenous knowledge and cultural practices related to terrace farming, water management, and natural resource conservation through intergenerational knowledge exchange and documentation.

- **Livelihood Diversification and Economic Resilience**: Support community-based livelihood diversification initiatives in eco-tourism, handicrafts, and sustainable forest products to reduce dependence on agriculture and enhance economic resilience.

- **Capacity Building and Education:** Provide training on climate-resilient agriculture, sustainable land management, and disaster risk reduction for farmers, community leaders, and local officials, fostering partnerships for knowledge exchange and technology transfer.

- **Infrastructure Development and Access to Services**: Improve infrastructure such as roads, bridges, and irrigation facilities to enhance connectivity and access to essential services, including reliable power supply through renewable energy solutions.

- **Policy Support and Institutional Coordination:** Advocate for policies prioritizing climate adaptation and resilience-building, strengthening institutional coordination among government agencies, civil society organizations, and indigenous communities for inclusive approaches to climate action

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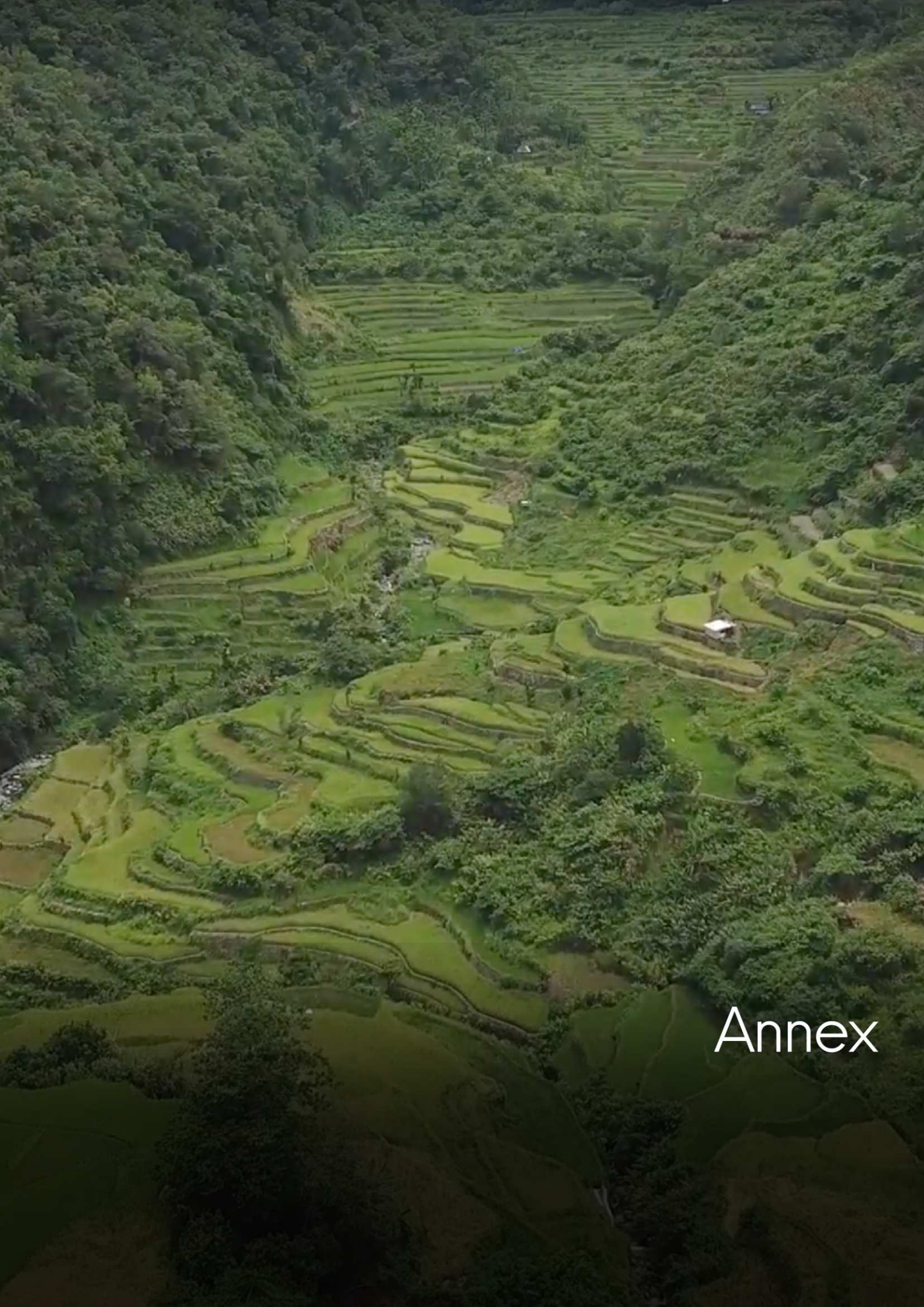

Annex

Annex 1. Provincial-scale observed and projected annual climate extremes

Ifugao

Extremes Index				Baseline Value	Moderate Emission (RCP4.5)			High Emission (RCP8.5)		
Type	Code	Description	Unit		Early (2020-2039)	Mid (2046-2065)	Late (2080-2099)	Early (2020-2039)	Mid (2046-2065)	Late (2080-2099)
Temperature	**Magnitude**									
	TNn	Coldest night time temperature	°C	13.9	14.8 (0.9)	15.2 (1.3)	15.4 (1.5)	14.9 (1.0)	15.9 (2.0)	17.0 (3.1)
	TNm	Average night time temperature	°C	18.9	19.5 (0.6)	20.2 (1.3)	20.4 (1.5)	19.8 (0.9)	20.7 (1.8)	22.2 (3.3)
	TNx	Warmest night time temperature	°C	22.0	22.6 (0.6)	23.3 (1.3)	23.7 (1.7)	22.9 (0.9)	23.9 (1.9)	25.3 (3.3)
	TXn	Coldest day time temperature	°C	22.5	23.0 (0.5)	23.5 (1.0)	23.8 (1.3)	23.0 (0.5)	24.0 (1.5)	25.4 (2.9)
	TXm	Average day time temperature	°C	27.7	28.4 (0.7)	29.0 (1.3)	29.4 (1.7)	28.6 (0.9)	29.5 (1.8)	31.1 (3.4)
	TXx	Warmest day time temperature	°C	32.0	32.6 (0.6)	33.4 (1.4)	33.9 (1.9)	32.8 (0.8)	34.1 (2.1)	35.9 (3.9)
	DTR	Daily temperature range	°C	8.8	8.8 (0.0)	8.8 (0.0)	8.9 (0.1)	8.8 (0.0)	8.7 (-0.1)	8.9 (0.1)
	Frequency									
	TN10p	Fraction of cold nights	%	11.6	5.5 (-6.1)	3.2 (-8.4)	2.6 (-9.0)	4.5 (-7.1)	2.0 (-9.6)	0.8 (-10.8)
	TN90p	Fraction of warm nights	%	11.5	29.2 (17.7)	55.4 (43.9)	64.9 (53.4)	39.0 (27.5)	68.5 (57.0)	89.3 (77.8)
	TX10p	Fraction of cool days	%	11.6	6.6 (-5.0)	3.6 (-8.0)	2.5 (-9.1)	5.5 (-6.1)	2.6 (-9.0)	1.3 (-10.3)
	TX90p	Fraction of hot days	%	11.6	19.6 (8.0)	34.5 (22.9)	45.2 (33.6)	23.6 (12.0)	46.5 (34.9)	73.9 (62.3)
	Duration									
	WSDI	Warm Spell Duration Index	days	6.8	35.7 (28.9)	146.9 (140.1)	262.7 (255.9)	84.6 (77.8)	297.3 (290.5)	365.0 (358.2)
Precipitation	**Magnitude**									
	PRCPTOT	Total wet-day rainfall	mm	1947.1	1853.2 (-93.9)	1895.4 (-51.7)	1872.2 (-74.9)	1948.1 (1.0)	1850.8 (-96.3)	1811.0 (-136.1)
	SDII	Average daily rainfall intensity	mm/day	13.1	12.6 (-0.5)	12.7 (-0.4)	12.5 (-0.6)	13.0 (-0.1)	12.5 (-0.6)	12.5 (-0.6)
	Rx1day	Maximum 1-day rainfall total	mm	92.9	92.5 (-0.4)	101.6 (8.7)	97.7 (4.8)	94.8 (1.9)	98.0 (5.1)	109.1 (16.2)
	Rx5day	Maximum 5-day rainfall total	mm	202.3	207.4 (5.1)	211.1 (8.8)	214.7 (12.4)	207.3 (5.0)	197.4 (-4.9)	230.9 (28.6)
	P95	Rainfall on very wet days	mm	37.9	35.9 (-2.0)	36.9 (-1.0)	36.8 (-1.1)	37.3 (-0.6)	37.0 (-0.9)	36.8 (-1.1)
	P99	Rainfall on extremely wet days	mm	72.2	68.9 (-3.3)	73.5 (1.3)	74.9 (2.7)	73.9 (1.7)	70.6 (-1.6)	76.7 (4.5)
	R95p	Total rainfall from very wet days	mm	438.8	381.8 (-57.0)	430.5 (-8.3)	427.8 (-11.0)	431.5 (-7.3)	429.6 (-9.2)	460.3 (21.5)
	R99p	Total rainfall from extremely wet days	mm	145.7	129.8 (-15.9)	156.1 (10.4)	170.5 (24.8)	154.5 (8.8)	147.7 (2.0)	185.2 (39.5)
	Frequency									
	P95d	Number of very wet days	days	7.5	6.6 (-0.9)	7.0 (-0.5)	6.8 (-0.7)	7.2 (-0.3)	6.8 (-0.7)	7.0 (-0.5)
	P99d	Number of extremely wet days	days	1.5	1.4 (-0.1)	1.6 (0.1)	1.7 (0.2)	1.7 (0.2)	1.5 (0.0)	1.7 (0.2)
	Duration									
	CWD	Longest wet spell	days	19.1	17.7 (-1.4)	18.3 (-0.8)	19.2 (0.1)	18.7 (-0.4)	18.1 (-1.0)	18.6 (-0.5)
	CDD	Longest dry spell	days	46.4	47.1 (0.7)	46.8 (0.4)	51.2 (4.8)	46.5 (0.1)	49.5 (3.1)	48.4 (2.0)

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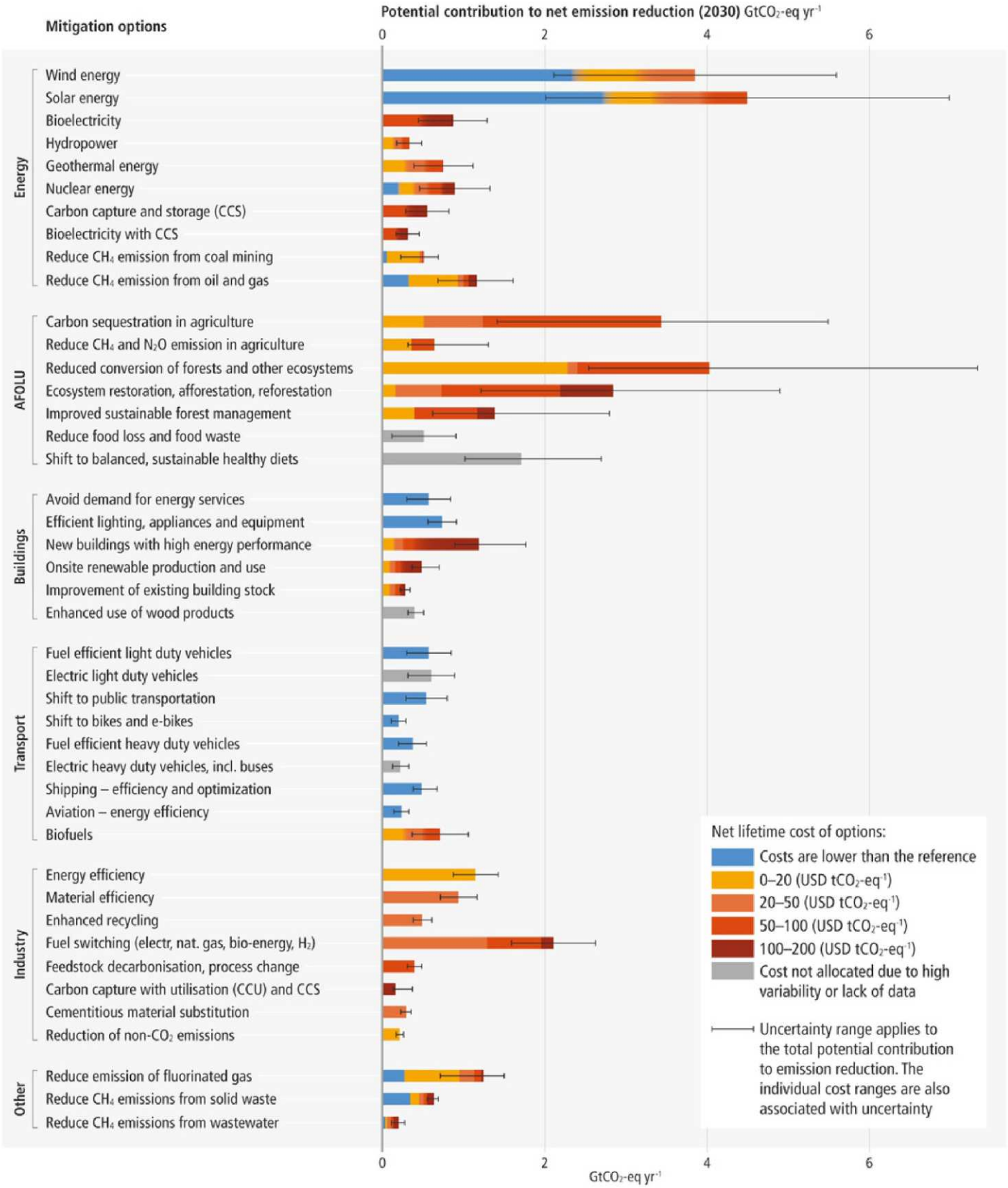
Source: Philippines Climate Extremes Report 2020.

Annex 2. Available mitigation options for significantly reducing greenhouse gas emissions by 2030 (Source: IPCC AR6 - WGIII Figure SPM.7)

Many options available now in all sectors are estimated to offer substantial potential to reduce net emissions by 2030. Relative potentials and costs will vary across countries and in the longer term compared to 2030.



Annex 3. Examples of available adaptation options for various representative key risks
(Source: IPCC AR6 - WGII Table 17.1)

Table 17.1 | Selected adaptation options per Representative Key Risk (RKR; see Section 16.5.2.2), with examples of each option from across the report. Many of the adaptation options are relevant to multiple RKRs, and have been selected to be representative of the wide variety of adaptation options implemented or suggested around the world.

RKR	Adaptation option	Examples from regional and sectoral chapters and cross-chapter papers
Risk to coastal socio-ecological systems	Coastal accommodation	Raising of dwellings, raising of coastal roads (Section 15.5.2), amphibious building designs (CCP2), improved drainage (Section 11.3.5.3)
	Coastal infrastructure	Seawalls, beach and shore nourishment (Sections 3.6, 15.5.1), breakwater structures (Section 15.5.1), dykes, revetments, groynes or tidal barriers. (Section 6.3.4.8), land reclamation (Section 15.5.2)
	Strategic coastal retreat	Retreating from coastal areas (Section 3.6, Cross-Chapter Box SLR in Chapter 3, Section 6.3.5.1, CCP2), relocation/resettlement (CCP2)
Risk to terrestrial and ocean ecosystems	Restore/create natural areas	Marine protected areas (FAQ 3.5), active restoration of coral reefs (Section 3.6.2.3.2), ridge-to-reef management (CCP1), restoring dunes (CCP4), planting salinity-tolerant trees (Section 4.5.2.1) Increasing forest cover (CCP7), detect and manage forest pests (Section 11.3.4.3)
	Reduce ecosystem stress	Reduce pollution and eutrophication (Section 3.3.3), reduce anthropogenic pressures on the Great Barrier Reef (Box 11.2), sustainable fisheries harvest (Section 3.6.2), increasing connectivity between natural areas (Section 2.6.2)
	Ecosystem-based adaptation	Marine habitats to protect against storm surge (Section 3.6), agroecology (Section 5.14.1.1), coastal and marine vegetation and reefs (Section 6.3.3.4), vegetation corridors, greenspace, wetlands (FAQ 6.3), mangrove habitat restoration (Sections 8.5.2.2, 9.8.5.1), restoring coasts, rivers, wetlands to reduce flood risk (Section 2.6.3, CCP1), urban green space to reduce temperatures (Section 2.6.3)
Risks associated with critical physical infrastructure, networks and services	Infrastructure retrofitting	Air conditioning (Section 6.3.4), using thermosiphons for permafrost degradation (Section 10.4.6.4.1), increasing rooftop albedo (for reflectivity) (Section 11.3.5.3), shading (Section 13.A.4)
	Building codes	Drainage systems (Section 4.5.2.1), architectural and urban design regulations (Section 6.3.4.2), infrastructure standards initiatives (CCP6), Chile's Sustainable Housing Construction Code (Section 12.5.5.3)
	Spatially redirect development	Zoning/land use planning (Section 6.3.2.1), spatial development planning to regulate coastal development (CCP2)
Risk to living standards and equity	Insurance	Agricultural insurance and micro-credit (Sections 4.5.2.1, 10.4.5.5), index-based insurance, market and price insurance (Section 5.14.1.3), flood insurance (Section 10.5.3.2), collective insurance schemes (Section 12.5.7.5)
	Diversification of livelihoods	Combining income-generating activities within fisheries sector (Section 3.6.2.2) Community level adaptation by Pangnirtung Inuit through diversification to stabilise income and food resources (CCP6)
	Social safety nets	Food for work programmes (Section 4.5.2.1), school feeding programmes (Section 7.4.2.1.3), social protection programmes, such as unemployment compensation (Section 10.5.6)
Risk to human health	Availability of health infrastructure	Safe drinking water infrastructure (Section 4.5.2.1), temperature-controlled low-income housing (Section 11.3.6.3), health care clinics (Section 6.4 case study), place-specific mental health infrastructure and 'nature therapy' (Section 14.4.6.8)
	Access to health care	Access to health care services (Section 11.3.6.3), access to health, nutrition services and healthy environments (water and sanitation) (Section 7.6), enhanced access to culturally appropriate mental health resources; 'Telemedicine' (information technologies and telecommunications for health and public health service delivery) (Section 12.6.1.5)
	Disaster early warning	Early warning of marine heatwaves (Section 3.6.2.3.3) early warning for pests (Section 5.12.5), Heat Action Plans (HAP) (Section 7.4.2.1.2), raising public awareness through campaigns (FAQ13.3)
Risk to food security	Farm/fishery improvements	Changing fishing gear or vessel power (Section 3.6.2.2.3), change crop variety or timing (Section 4.5.2.1, CCP5, Section 8.5), close productivity gaps (Section 5.12.5), biotechnology (Section 5.12.5), irrigation schemes (Section 9.12.5.3), integrated crop/livestock systems (Section 5.10.1), relocating livestock linked to improved pasture management (Section 13.5.2)
	Food storage/distribution improvements	Improve transportation infrastructure and trade networks, shortened supply chains (Sections 5.12.5, 9.12.5.3), improved food storage (Sections 5.12.5, 7.4.2), local food production/chains (Cross-Chapter Box COVID in Chapter 7)
	Behaviour change in diets and food waste	Reduce food loss and waste (Section 5.12.5), shifts to more plant-based diets (Section 7.4.5.2), creating demand for organically sourced food (Section 10.5.3.2)
Risk to water security	Water capture/storage	Farm ponds and revival of water bodies (Section 4.5.2.1), rain gardens, bioswales or retention ponds (Section 6.3.3.6), water storage tanks (Section 10.5.3.2), multi-purpose water reservoirs and dams (CCP5)
	Efficient water use/demand	Precision/drip irrigation (Section 4.5.2.1), Managed Aquifer Recharge (MAR) (Section 9.4), cooperative policies across multiple sectors (CCP4), changing water consumption patterns (CCP4)
	Efficient water supply/ distribution	Constructing irrigation infrastructure (Section 4.5.2.1), inter-basin transfers (Section 6.3.3.6), water reuse (Section 13.A.3), slum/ water upgrading (Section 6.4.3)
Risk to peace and migration	Seasonal/temporary mobility	Fishing fleet mobility to follow species distribution (Section 3.6.2.2.2), mobility for seasonal employment and remittances (Section 4.5.2.1, Cross-Chapter Box MIGRATE in Chapter 7), legal/illegal labour migration (CCP3), pastoralist seasonal migrations (Cross-Chapter Box MIGRATE in Chapter 7)
	Cooperative governance	Transboundary fishing agreements (Section 3.6.4.1), ocean governance (Section 3.6.2.2), collective water management (Section 4.5.2.1), indigenous water-sharing systems (Section 4.5.2.1), enforcing the land rights of indigenous populations (CCP7), adaptive co-management in Arctic fisheries (CCP6), international compact on migration (Cross-Chapter Box MIGRATE in Chapter 7), policies for adaptive governance (Section 8.5)
	Permanent migration	Resettlement of flood-prone communities (Section 4.5.2.1), rural–urban migration (Section 6.1 case study), internal migration (Box 10.2), international migration and remittances (Sections 8.6.3, 14.4.7.3)

Annex 4. Value attributes

Recognizing the characteristics that express community-held values is essential for safeguarding and overseeing a cultural landscape. Identifying these attributes, along with associated values, enhances our comprehension of the World Heritage site and its broader context. Precisely documenting the location and details of these attributes is also crucial for crafting sensitivity maps, which can be valuable tools when considering conservation projects. Moreover, attributes serve as indispensable components for conducting impact assessments associated with World Heritage sites.

I. TAWID (HERITAGE ATTRIBUTES)

- **Payoh/Pajaw (Terraced fields):** The Payoh in Ifugao culture represents terraced fields that are not only cultivated but also symbolize a cultural heritage. Passed down through primogeniture, these meticulously constructed agricultural landscapes hold significant importance as they are considered the most valuable and cherished real property among the Ifugao people. The cultivation of payoh is intricately linked to traditional social status, serving as the foundation upon which the Ifugao community establishes its hierarchy and individual prestige. These terraced fields exemplify the fusion of agricultural ingenuity, inheritance customs, and social stratification in the unique and vibrant Ifugao culture.

- **Muyung/Pinuguh (Private woodlots):** The "muyung" is a distinctive feature of the Ifugao rice culture, comprising privately owned forests that are intricately tied to family heritage. These agro-forests serve as invaluable sources of construction and handicraft materials, contributing significantly to the sustainability of Ifugao communities. Moreover, muyung plays a crucial role as a secondary food source, providing additional sustenance to the community. Inherited alongside rice fields, ownership of muyung is governed by customary laws that uphold the principles of stewardship and sustainable resource management. Often referred to as "tudung di payo" or the "crown of the rice terraces," the muyung embodies the essence of Ifugao tradition, representing the harmonious interdependence between nature, culture, and livelihoods in this unique mountainous landscape.

- **Inalahan (Communal forests):** The "Inalahan" is a distinct aspect of Ifugao culture, representing communal forests that are exclusively owned and managed by a particular Ifugao community. These forests serve a multifaceted purpose as they are designated hunting grounds, meticulously regulated by Ifugao customary law. Inalahan embodies the principles of sustainability and stewardship, ensuring that hunting and gathering activities within these sacred woodlands adhere to traditional practices and ecological balance. What sets Inalahan apart is the concept of perpetual ownership by the community, signifying not just a resource but a heritage passed down through generations, where the Ifugao people harmoniously coexist with nature and honor their ancestral connections to the land.

- **Boble (Home Village):** "Boble," the home village, is a tightly-knit community primarily characterized by familial ties and blood relations. Within this village, the bonds among its inhabitants are deeply rooted in shared ancestry and kinship, fostering a strong sense of interconnectedness and unity. The residents of the Boble not only share physical proximity but also a common lineage, which forms the foundation of their social fabric and shapes their collective identity. In addition to their close-knit nature, the people of the Boble also hold a crucial role as stewards of the rice terraces. They are entrusted with the preservation and sustainable management of these intricate agricultural systems, which have been carefully crafted over generations. Knowledge about the rice terrace system is passed down from elders to younger members of the community, ensuring the continuity of traditional farming practices and the wisdom needed to maintain the terraces' structural integrity. The Boble serves as a living repository of this invaluable cultural and agricultural heritage, where the legacy of rice terrace stewardship is both cherished and perpetuated.

- **Odon (heirloom properties):** Odon represents a cherished and culturally significant aspect of inheritance among Ifugao communities. These are heirloom properties, intricately tied to ancestral heritage, which are traditionally passed down from one generation to the next, often accompanying inherited rice fields. Odon includes a diverse array of precious items, each carrying its unique historical and symbolic value. These heirloom properties can encompass a range of items such as precious beads, gold jewels, ancient rice wine jars, gongs, and ritual paraphernalia. Each of these artifacts is laden with cultural significance and typically signifies not only the ownership of the associated rice fields but also the rich tapestry of traditions, rituals, and customs woven into the fabric of the community. Odon, in its various forms, serves as a tangible connection to the past, embodying the wisdom and prosperity of ancestors who carefully preserved these treasures. They symbolize not just material wealth but the spiritual and cultural heritage tied to rice field ownership, reinforcing the idea that land ownership is not just about physical possession but also about carrying forward the collective memory and legacy of a community's ancestors. In its general context of inheritance, terraced rice fields are also Odon.

- **Nitaguwan (Social status):** "Nitaguwan" is a traditional social stratification system intrinsic to Ifugao culture, primarily anchored on the ownership and management of rice terraces, as well as the performance of feasts of merit. In this intricate social structure, the wealth, and prestige of an Ifugao individual, referred to as a "kadangyan" or social elite, are fundamentally predicated on their ownership and effective stewardship of rice fields. The term "nitaguwan" encapsulates the hierarchical arrangement of Ifugao society, with those who possess larger, well-maintained rice terraces occupying higher social strata. These individuals are not only seen as custodians of agricultural wealth but also as cultural leaders who play a pivotal role in the community's rituals and ceremonies, including the organization and sponsorship of feasts of merit. These feasts are elaborate celebrations that showcase the prosperity and generosity of the hosts, further elevating their social status. In essence, "nitaguwan" signifies the deep intertwining of agricultural expertise, cultural leadership, and socio-economic hierarchy within Ifugao society, where rice field ownership serves as both a symbol of status and a means of preserving the cultural and economic vitality of the community.

II. TANUD (ECONOMIC ATTRIBUTES)

- **Tinawon (Heirloom rice varieties):** The Tinawon rice variety stands as a testament to the rich heritage and symbiotic relationship between the Ifugao people and their highland environment. These traditional rice strains, meticulously bred and finely adapted to the challenging terrain, have played multifaceted roles in Ifugao culture over the centuries. As the cornerstone of their subsistence, Tinawon rice was not merely a staple food but also a versatile commodity and even a form of currency in earlier times. It served as the primary medium of exchange in the intricate barter system known as "hubli," facilitating trade and social interactions among communities. The name "Tinawon," which translates to "once a year rice," reflects its unique cropping cycle, where it is cultivated once annually, mirroring the rhythmic cadence of agricultural life in the highlands. Tinawon rice is far more than a crop; it possesses a spiritual essence, according to Ifugao elders. It is believed to have a soul, infusing it with profound ritual significance. The rice becomes the subject of intricate rice rituals that honor the bond between the Ifugao people, the land and the gods. The cultivation of Tinawon rice serves as the epicenter of the village's existence, dictating the timing and coordination of all other communal tasks. Furthermore, the different stages of its growth dictate the roles of men and women within the fields, at home, and in the forests, reinforcing the intricate division of labor within the community. Natural indicators, such as the blooming of the Tubuh reed along the riverbanks, serve as cues for the commencement of panal, the crucial act of laying rice seeds for germination. This attunement to nature's signals exemplifies the Ifugao people's profound connection to their environment, their sustainable farming practices, and their unwavering respect for the intricate interplay between culture and nature. In essence, Tinawon rice is more than just a crop; it is a cultural treasure, a symbol of heritage and identity, and a testament to the deep-rooted traditions and harmonious coexistence between the Ifugao people and their highland homeland.

- **Inalahan (Communal forests as hunting grounds):** The Inalahan communal forests of the Ifugao have significant economic value for the community. These forests serve as hunting grounds for game and sources of wild food, which directly contribute to food security for the community. Moreover, they act as a natural defense system for the rice terraces below, saving costs on erosion control and terrace restoration. The Inalahan forests also play a crucial role in the traditional "holok" ritual, which is vital for preventing pests in the terraces and enhancing productivity. They serve as a rich source of herbs and other pesticidal flora used in this ritual. This traditional knowledge reduces the community's reliance on external pesticides, saving both money and preserving the environment. Furthermore, the forests function as buffer zones between community territories, protecting valuable rice terraces that attract tourists, thereby supporting the local economy. Additionally, the Inalahan forests foster community cohesion, potentially leading to collaborative economic activities. Overall, these forests are not just natural resources but economic assets intertwined with the community's well-being, culture, and heritage.

- **Habal/uma (swidden farms as secondary food source):** The "habal" or "umah" represents a significant economic attribute of the rice terraces in the Ifugao culture, offering a range of benefits and contributing to the livelihoods of terrace farmers in several ways. Primarily, the habal serves as a secondary food source for terrace farmers and their households. The main crop cultivated in the habal is sweet potato, providing an alternative staple to rice. This diversification of food sources helps ensure food security and mitigates the risks associated with relying solely on one primary crop. Moreover, the habal is characterized by its variety, with farmers also planting other vegetables such as mung beans, corn, legumes, and leafy greens. This diversity enhances the nutritional value of the local diet and provides a broader range of food options for the community. In terms of biodiversity, the habal is often more diverse than the terraces themselves. This diversity not only contributes to the resilience of the local ecosystem but also allows farmers to harness a wider range of crops, reducing the impact of crop failures and pests. Additionally, the habal plays a role beyond human consumption. It serves as a source of food for household animals like pigs and chickens, which are often raised for rituals and community occasions. This highlights the holistic nature of the agricultural system in the Ifugao culture, where every aspect of farming, from crops to animals, is intertwined with their traditions and social events. The habal represents a valuable economic asset within the rice terraces, offering food security, diversification of crops, biodiversity, and a source of sustenance for both households and the community's rituals and celebrations.

- **Pinugu/muyung (ago-forests as source of crafts materials, construction, fruits, etc.):** The "pinugu" or "muyung" is a valuable economic attribute of the rice terraces, serving multiple functions and contributing significantly to the well-being of the community. These family-owned woodlots play a pivotal role in enhancing biodiversity through assisted natural regeneration. By preserving these forests, the community promotes the growth and sustenance of a variety of plant and animal species, enriching the local ecosystem and reinforcing its long-term resilience. The economic importance of pinugu or muyung becomes apparent in its role as a source of timber and construction materials. The trees in these woodlots provide essential resources for building houses and serve as raw materials for handicrafts such as wood carving and basketry. This not only reduces the need for purchasing expensive construction materials but also supports local craftsmanship and trade. Beyond serving as a resource, pinugu or muyung provides a protective layer for the downhill terraces. By preventing erosion and mitigating water runoff, these forests safeguard the structural integrity of the rice terraces, reducing the costs associated with erosion control measures and the restoration of damaged terraces. Moreover, these woodlots offer an ecological benefit by contributing nutrients to the rice fields below. The decomposing forest litter enriches the soil, enhancing its fertility and productivity. This natural nutrient cycle reduces the need for external fertilizers, promoting sustainable agricultural practices. In summary, pinugu or muyung represents a multifaceted economic asset within the rice terraces, contributing to biodiversity, providing valuable resources for construction and handicrafts, protecting against erosion, and enhancing the fertility of the rice fields. Its significance extends beyond economic value, encapsulating the harmonious relationship between the Ifugao people, their environment, and their sustainable way of life.

- **Nabnong an payo (Terraced landscape) and Bilid (Mountain view) For Tourism:** The terraces and mountain views of Ifugao are not only cultural and natural wonders but also vital economic assets through tourism. The allure of these breathtaking landscapes has positioned them as significant contributors to the local economy, generating income and supporting various livelihoods.

    1. **Tourism Services:** The tourism industry in Ifugao has diversified, providing numerous income opportunities for local residents. Tour guiding is a prominent occupation, with knowledgeable guides leading visitors on informative and immersive journeys through the terraces. Porter services also thrive, offering assistance to trekkers and tourists exploring the rugged terrain. These services create jobs and generate income for the community.
    2. **Accommodation:** The increasing number of tourists has led to the development of accommodation options, including homestays, hotels, and guesthouses. Local residents often open their homes to tourists, providing a more authentic cultural experience while generating additional income. Hotels and guesthouses cater to a wider range of visitors, contributing to the local economy.
    3. **Food Services:** The tourism influx has boosted the restaurant and culinary scene in Ifugao. Restaurants serve traditional Ifugao dishes and international cuisine, attracting both domestic and international visitors. This has created opportunities for local chefs and food entrepreneurs to showcase their culinary skills and generate income.
    4. **Transport Services:** To accommodate tourists, transportation services have expanded. Locals provide transportation options such as jeepneys, tricycles, and car rentals, creating employment and income for drivers and vehicle owners.
    5. **Souvenir Trade:** Tourism has driven the sale of souvenir items, fostering the production and conservation of local crafts. Visitors purchase handcrafted goods such as woven textiles, wood carvings, metal crafts, and basketry, supporting local artisans and preserving traditional craftsmanship. This not only generates income but also helps sustain cultural heritage.
    6. **Cultural Performances:** Cultural performances, including traditional dances and music, have become part of the tourist experience. Local performers and cultural groups earn income by showcasing their talents and heritage.

The economic impact of tourism in Ifugao extends beyond direct income generation. It also stimulates related sectors such as agriculture (through increased demand for local produce) and infrastructure development (to accommodate tourists). However, sustainable tourism practices are crucial to balance economic benefits with environmental and cultural conservation. Community-led initiatives often reinvest tourism revenue into conservation efforts, ensuring the longevity of the terraces and the preservation of local traditions.

III. PANGAT DI AAMMOD YA TUGUN DI KADAMAN (IKSP/KNOWLEDGE VALUES)

In Ifugao culture, traditional knowledge, custom law and spirituality are intricately intertwined within a holistic value system. These two facets are deeply interconnected, shaping every aspect of Ifugao life and their relationship with the environment.

At the core is a belief in cosmic harmony, where humans, nature, and spirits are interconnected. This belief guides their interactions with the natural world, influencing practices such as the construction and maintenance of their iconic rice terraces. Spiritual rituals and ceremonies are integral, serving as a means to seek blessings and guidance from ancestral spirits. This spiritual knowledge is interwoven with their practical understanding of agriculture, driving sustainable farming practices.

Much of this knowledge is passed down orally through stories and songs, reinforcing their cultural and spiritual values. These shared traditions strengthen community bonds and collective responsibility.

Overall, the blend of traditional knowledge and spirituality is deeply rooted in sustainability, ecological balance, and cultural identity, making it a profound and enduring aspect of Ifugao culture.

- **Punliyak (knowledge of rice agriculture):** Punliyak or punpayoh is the bedrock of knowledge within the rich tapestry of the Ifugao terraces, and it finds its deepest roots in the heart of their traditional rice culture. It represents an extensive reservoir of wisdom that transcends mere farming techniques, encapsulating a profound understanding of every facet of rice cultivation. For the Ifugao people, adeptness in the rice culture is synonymous with possessing the holistic wisdom of "punliyak." At its essence, "punliyak" signifies a comprehensive grasp of all aspects related to rice, from the intricacies of terrace construction, stonewalling, irrigation, planting and harvesting to the nuanced rhythms of nature and culture. It entails an acute awareness of natural weather indicators, where cloud formations, wind patterns, humidity levels, and the behaviors of local flora and fauna are meticulously observed and interpreted. These cues become the farmer's compass, guiding decisions on when to plant, irrigate, or harvest their rice crops, all in harmony with the environment.

- Yet, "punliyak" doesn't stop at terrestrial observations; it reaches to the heavens quite literally. It encompasses the meticulous tracking of the sun and moon's celestial movements, ingrained within the Ifugao's agricultural calendar. The positioning of these celestial bodies in the sky serves as critical cues for activities like field preparation and planting, ensuring that the entire agricultural cycle remains closely synchronized with the celestial rhythms.

- More than just practical knowledge, "punliyak" embodies the Ifugao's cultural heritage and ancestral wisdom, passed down through generations. It represents the collective memory of the community, preserving traditional practices and rituals intertwined with rice cultivation. These rituals transcend the agricultural and become deeply entwined with the spiritual and social fabric of Ifugao life, reinforcing the profound connection between people, land, and rice.

- In embracing "punliyak," Ifugao farmers are not just aiming for high yields but also practicing sustainable farming. It guides them in the stewardship of the intricate terraces, emphasizing practices like terrace maintenance, soil conservation, and water management, ensuring the terraces' enduring productivity.

- "Punliyak" isn't just a body of knowledge; it's the very essence of the Ifugao people's cultural identity. It is a way of life and a source of immense pride. It is a testament to their rich heritage and distinctive traditions, fostering a deep sense of belonging and continuity among the community. In "punliyak," the Ifugao people find the wisdom of sustainable agriculture, the preservation of cultural legacy, and the harmonious coexistence of humankind and nature.

- **Punmuyung (Forest management):** "Punmuyung," or forest management, is an attribute of the knowledge value associated with the Ifugao terraces. This traditional knowledge reflects a deep understanding of the intricate relationship between forests and the terraces, illustrating how these two elements are inseparable components of the Ifugao rice culture.

- At its core, "punmuyung" embodies the concept that forests are the "tudung di payo" or shield of the terraces. This metaphor underscores the critical role of forests in protecting the rice terraces from various environmental challenges, including soil erosion, landslides, and excessive water runoff. The preservation and maintenance of these forests are paramount to the continuity and sustainability of the rice terraces.

- In the realm of Ifugao customary property law, there is a connection between the forest and the rice fields. The forest is considered an accessory to the rice fields, and inheriting the rice terraces also entails inheriting the associated woodlot or muyung. This legal framework highlights the integral nature of forests within the agricultural landscape of the Ifugao people.

- One of the core practices in "punmuyung" involves the concept of assisted natural regeneration. Rather than imposing radical interventions, Ifugao forest management is characterized by a harmonious approach to nurturing the forest's natural growth. Ifugao individuals are not just tree planters; they are masters of the forest, planting the right tree species in the right location at the right time. This wisdom is a testament to their ecological knowledge.

- Moreover, "punmuyung" extends beyond individual benefit or short-term gain. Similar to their approach to rice terrace management, the Ifugao people embrace a concept of inter-generational responsibility. They recognize that their role as stewards of the forest extends to future generations. Therefore, they feel obligated to care for and enrich the forest, ensuring that it thrives for the generations yet to come.

- The managment of the muyung or pinugo represents a deep and holistic knowledge value within the Ifugao terraces culture. It illustrates the intricate relationship between forests and terraces, emphasizing the importance of forest management in protecting and sustaining the terraces. This knowledge is not just about practical forest care; it embodies a deep sense of responsibility, sustainability, and the interconnection between humans and their environment.

- **Punhabal (swiddening or shifting cultivation):** The knowledge of swidden farming, deeply embedded in the practices of the Ifugao people, is a remarkable attribute of their terraces. This traditional farming method, also known as habal or uma represents a cornerstone of their agricultural heritage and demonstrates their intricate and sustainable approach to farming. What sets the Ifugao's swidden farming apart is its integration with the terraces. Rather than being isolated practices, swidden farming and terrace cultivation are seamlessly interwoven. Swidden fields serve as a supplementary source of food and as an alternative in case of crop failure in the rice terraces.

- Sustainability lies at the heart of swidden farming. The Ifugao people exercise careful consideration in selecting areas for shifting cultivation, allowing ample time for soil recovery before returning to cultivate the land. This knowledge of land-use planning and crop rotation is vital for preventing soil depletion and safeguarding the long-term productivity of both swidden fields and terraces.

- Swidden farming's diversity is another notable aspect. These fields are not confined to a single crop but rather host a rich variety of vegetables, root crops, and grains. This diversity ensures a balanced diet for the community and minimizes the risk of crop losses due to pests or diseases.

- Importantly, swidden farming is intimately linked with forested areas. The Ifugao people possess a profound understanding of the forests' significance, recognizing their role in watershed protection, biodiversity conservation, and sustainable farming. The proximity of swidden fields to forests facilitates the nutrient cycle and enriches soil fertility.

- The practice of swidden farming relies heavily on traditional knowledge and indigenous agricultural techniques. Ifugao farmers have a deep understanding of when to clear land, how to choose suitable crops, and how to manage fallow periods. This knowledge is often passed down through generations, reinforcing the sustainability of the system.

- Beyond its agricultural significance, swidden farming is a reflection of Ifugao culture and values. It embodies their deep connection to the land, their profound respect for the natural world, and their unwavering commitment to sustainability. This traditional knowledge is not just a farming method; it is a symbol of the Ifugao people's resilience and their harmonious coexistence with the unique highland environment.

- **Hongan di Pa'ge (Rice Rituals):** "Honga'n di Pàge," the rice rituals of the Ifugao people, is an essential and multifaceted attribute within the knowledge dimension of the Ifugao rice terraces system. These rituals transcend mere ceremonies; they encompass a profound repository of cultural, spiritual, and agricultural wisdom that has sustained the Ifugao way of life for generations. At its core, "Honga'n di Pàge" serves as a living embodiment of the cultural identity of the Ifugao people. It signifies their rich heritage, values, and traditions, serving as a source of communal pride and a means of preserving their distinctive cultural legacy. Practically, these rituals are intricately linked to the agricultural calendar, marking crucial phases in the rice cultivation cycle. Every single step of the rice cycle is marked by a specific ritual. They offer invaluable knowledge, guiding farmers on when to initiate pivotal agricultural activities, aligning farming practices with the rhythms of the celestial and environmental cycles.

- Moreover, "Honga'n di Pàge" fosters a profound spiritual connection between the Ifugao people, their ancestral land, and their forebears.

- These rituals are performed to seek the blessings and protection of ancestral spirits and deities, reinforcing the belief that the terraces are not mere fields but sacred spaces that require reverence.

- Embedded within these rituals is a profound understanding of sustainable farming practices. They underscore the importance of maintaining ecological equilibrium, conserving soil and water resources, and respecting the natural world. This knowledge is essential for ensuring the long-term productivity and vitality of the terraces.

- Beyond agriculture and spirituality, "Honga'n di Pàge" also plays a pivotal role in fostering social cohesion. These rituals are often communal, involving the collective efforts of the entire village. They serve as a unifying force, creating a shared sense of purpose and responsibility within the community.

- The knowledge dimension of rice rituals is primarily passed down orally, with elders and ritual specialists transmitting the intricate details of these ceremonies to younger generations. This oral tradition not only safeguards the rituals but also perpetuates the intergenerational transfer of cultural wisdom. Additionally, these rituals encompass resource management aspects, including the distribution of water from communal irrigation systems and the synchronizing of field activities. They establish rules and norms for equitable resource allocation, preventing conflicts and ensuring the efficient utilization of the terraces' resources. "Honga'n di Pàge" reflects the Ifugao people's deep commitment to environmental stewardship. These rituals often involve offerings and actions that symbolize their profound respect for the natural world and their role as custodians of the land. In essence, "Honga'n di Pàge" represents a holistic and multidimensional attribute of the knowledge dimension of the Ifugao rice terraces. It serves as a testament to the intricate interplay of culture, spirituality, agriculture, sustainability, community, and environmental stewardship. These rituals are not mere ceremonies; they are a reservoir of Ifugao wisdom, ensuring the terraces' continuity and the preservation of their cultural identity.

- **The Traditional Institution of the Tumonak (agricultural leader):** In the web of traditions and practices within the Ifugao rice terraces, the institution of the Tumonak emerges as a cornerstone of knowledge value. It holds a pivotal role in the management and coordination of rice cultivation within the agricultural districts known as "boble." Central to this role is the ownership of the "tonak," a sacred ritual rice field that stands at the heart of the district's agricultural activities. The Tumonak's responsibilities extend far beyond mere ownership. Among their most significant duties is overseeing the planting and cropping schedule of the tonak field. This responsibility is not to be underestimated, as it sets the rhythm for the entire district. A crucial facet of this system is that no one within the boble initiates planting until the Tumonak signals the start of this essential agricultural activity in the tonak field. This synchronized cropping practice carries profound implications:

- Firstly, it serves as an efficient means of labor coordination. With everyone in the community planting and harvesting at the same time, communal labor resources can be pooled effectively, leading to the timely completion of vital agricultural tasks.

- Secondly, the synchronized schedule aids in pest control. By planting and harvesting simultaneously, the risk of pest infestations is reduced. The collective effort enables the implementation of communal pest management practices more effectively.

- Additionally, the Tumonak assumes a role in resource management by ensuring the equitable distribution of water resources from communal irrigation systems. This not only guarantees that each field within the boble receives its fair share of water but also reinforces a sense of communal responsibility.

- Moreover, the institution of the Tumonak goes beyond practical matters; it fosters a profound sense of community cohesion. It becomes a unifying force, rallying the members of the boble to work collaboratively toward a shared agricultural goal. In this shared responsibility, social bonds are strengthened, emphasizing the interconnectedness of the community.

- Furthermore, the Tumonak and the tonak field carry deep cultural and spiritual significance. These rituals transcend mere agricultural practices; they are infused with spiritual meaning. They reinforce the profound connection between the community, their ancestors, and the land they inhabit.

- This particular role is evident in the "Punnuk", a post-harvest rice ritual among the Hapao Ifugaos in Hungduan. The punnuk was inscribed in the UNESCO Representative List of Intangible Cultural Heritage of Humanity in 2015. The tumonak is known as the dumupag in the Hapao, Hungduan area.

- In essence, the institution of the Tumonak represents a crucial attribute within the knowledge value of the Ifugao rice terraces. It ensures the synchronized rhythm of rice cultivation in the agricultural district (hin-puntona'an), with far-reaching implications that extend into labor coordination, pest control, resource management, community unity, and cultural and spiritual significance.

- **THE HUDHUD AND PUNNUK**

These two intangible attributes of the Ifugao rice terraces are placed under one sub-title owing to their universal significance as intangible heritage as listed by UNESCO.

- **"Hudhud"** The "hudhud" is a revered attribute of Ifugao traditional knowledge, representing a cherished cultural and historical tradition of the Tuwali-speaking Ifugaos. This epic chant holds a special place in the heart of the Ifugao community, as it accompanies crucial agricultural activities within the iconic rice terraces. In the terraces, it is chanted during transplanting and harvesting of the tinawon rice. Passed down through generations, it serves as an oral repository of knowledge, encapsulating stories of their ancestors, heroes, and the evolution of their society. These narratives are interwoven with the history of their community, providing valuable insights into their past and their ability to adapt while preserving core values.

- With deep spiritual significance, the "hudhud" often includes accounts of encounters with spirits, descriptions of ancestral rituals, and reflections on the profound relationship between humans and the supernatural world. This spiritual knowledge is an integral part of the "hudhud," reinforcing the spiritual connection that the Ifugao people maintain with their environment.

- As an oral tradition, the "hudhud" epitomizes the importance of oral transmission in Ifugao society. It relies on the skillful recitation of chanters who pass down the epic's content and cultural significance from one generation to the next. The "hudhud" also serves as a powerful tool for community bonding. Chanting and listening to the epic are communal activities that bring people together, fostering a sense of unity and shared cultural identity. The chanters themselves play a vital role in maintaining the cohesion of the community.

- Furthermore, the "hudhud" functions as a form of education for younger generations. It serves as a medium through which knowledge about history, culture, and the Ifugao way of life is conveyed. In this way, the "hudhud" ensures the continuity of traditional knowledge and values among the Ifugao people.

- In recognition of its exceptional value, the "hudhud" received global acclaim when UNESCO listed it as a Masterpiece of the Oral and Intangible Heritage of Humanity in 2008. This prestigious designation underscores the "hudhud" as an extraordinary and irreplaceable attribute of Ifugao traditional knowledge, contributing significantly to the world's cultural heritage.

- **The Punnuk:** The Punnuk is a significant attribute within the traditional knowledge value of the Ifugao rice terraces. It represents a post-harvest ritual practiced by the Hapao Ifugaos, which has deep cultural and spiritual significance. The punnuk was inscribed in the UNESCO (United Nations Educational, Scientific and Cultural Organization) Representative List of Intangible Cultural Heritage of Humanity together with other tugging rituals from Cambodia, Korea and Vietnam in 2015. The List comprises intangible cultural heritage (ICH) elements around the world deemed important for safeguarding and more awareness.

- The Punnuk ritual serves as the culminating part of the Tuwali Ifugao post-harvest ceremony known as "huwah." This ceremony is a thanksgiving celebration for the year's harvest and also functions as a means to ensure a prosperous harvest in the following year. The responsibility of leading the huwah and performing the Punnuk falls upon the dumupag, a kadangyan or wealthy-class family within the Hapao Ifugao community.

- The ritual commences with the baki ceremony, where the dumupag family enlists the expertise of a mumbaki, an Ifugao ritual specialist or shaman. The baki ceremony includes essential components such as declaring the conclusion of the harvest, partaking in communal feasting involving food and wine, conducting an animal sacrifice, and employing the gallbladder of a sacrificial chicken for divination. These rituals collectively serve to determine whether the conditions are favorable for the Punnuk to take place on the following day. The Punnuk proper takes place in the Hapao river where its tributaries meet. Three villages of the old Hapao district converge by the river in a jovial mock-up battle as water wrestling and tug-of-war take place among the villagers.

- The Punnuk, as an integral part of the Ifugao traditional knowledge value, represents a deep reverence for community solidarity, ancestral traditions, and the rice terraces. It embodies the Ifugao people's commitment to sustainable farming practices and the preservation of their cultural heritage. UNESCO's recognition of the Punnuk underscores its importance in safeguarding and celebrating the rich cultural tapestry of the Ifugao community, reinforcing its enduring significance in the modern world.

IV. KI-OHAAN DI BIMMOBLE (SOCIO-CULTURAL SOLIDARITY)

"Ki-ohaan di bimmoble," or socio-cultural solidarity, is a core Ifugao value that embodies the spirit of community unity and collective action. It signifies the Ifugao people's commitment to coming together as a cohesive unit, exemplifying esprit de corps. This value underscores their willingness to support one another, engage in self-help initiatives, and collaborate for the betterment of their community. It reflects a deep-rooted sense of communal responsibility, where each member actively contributes to the well-being of the whole, fostering social cohesion and resilience within Ifugao terraces communities.

While there are several manifestations of Ifugao solidarity, the following stand out as these were all mentioned in the different FGD areas:

- **Ubbu/ Ubfu (Reciprocal Labor):** Ubbu is a significant attribute within the framework of Ifugao socio-cultural solidarity, representing a core aspect of their communal values and the collective spirit that defines their society. This practice involves labor groups working together on each member's rice fields in a sequential manner, one field after another. The essence of ubbu lies in its ability to make agricultural work lighter and more efficient, promoting synchronized stages of cultivation and harvest since each field owner doesn't have to labor on their own. Ubbu is a classic feature of Ifugao rice culture where communal labor is not just beneficial but also necessary due to the intricate and labor-intensive nature of rice cultivation. It exemplifies the principle of community solidarity, emphasizing mutual support and cooperation among members. By working together on one another's fields, Ifugao communities ensure that the burden of agricultural tasks is shared, reducing the workload for individual farmers and fostering a sense of unity and interdependence.

- This practice not only eases the physical demands of farming but also leads to synchronized agricultural activities, where planting, harvesting, and other stages of cultivation are conducted collectively. Through the practice of ubbu, community members cultivate a profound sense of collective responsibility and stewardship, extending beyond their individual fields to encompass the entire terraces. Ubbu fosters a shared ownership mentality where every member feels a deep connection to not only their own plots but also those belonging to thei r fellow community members. This communal approach not only lightens the burden of agricultural tasks but also nurtures a shared commitment to care for and preserve the wider terraces, reinforcing the Ifugao people's sense of unity and collective guardianship over their cherished landscape.

- **Chawwa/ Lodah:** Chawwa is a significant socio-cultural attribute deeply ingrained in the practices of the rice terraces. It refers to a unique agricultural tradition where a person, who is not the original owner, takes on the responsibility of cultivating a rice terraces field that has been abandoned and left fallow for several years. In this practice, the designated individual commits to farming and maintaining the terraces for a number of years that has to be more than the years that it was abandoned.

- Chawwa carries profound implications for the restoration and rehabilitation of abandoned terrace fields.

- It represents a remarkable form of communal stewardship, where the collective well-being of the community takes precedence over individual ownership. When a field lies neglected for an extended period, the land's productivity can decline, and the terraces may face the risk of erosion and degradation. Chawwa intervenes as a remedy by revitalizing these neglected fields.

- This practice underscores the deep connection between the Ifugao people and their rice terraces. It reflects their commitment to sustainable agriculture and the preservation of their cultural heritage. Chawwa embodies a shared responsibility for the terraces' well-being and contributes to the broader goal of maintaining the productivity and ecological balance of these iconic landscapes. It exemplifies the Ifugao people's dedication to the continuity of their rice terraces and their adaptive strategies for ensuring their longevity in the face of changing circumstances.

- **Changa/Dang-a (Community volunteer work group):** Changa, also known as a community volunteer work group, is a pivotal attribute of socio-cultural solidarity deeply rooted in Ifugao society. It exemplifies the essence of collective cooperation and mutual support among community members. During a changa, individuals come together voluntarily to assist a fellow rice field owner with specific tasks, such as hauling construction materials from the forest to a construction site within the terraces. Another example is the construction of a rice granary, where the owner does not pay for labor but instead provides food and refreshments for the dedicated volunteers. This practice carries significant implications for Ifugao socio-cultural solidarity. Firstly, it embodies the principle of communal responsibility, emphasizing the collective well-being of the community over individual interests. When community members unite to help one another without financial gain, it fosters a sense of shared ownership and interconnectedness within the community. Secondly, changa promotes efficiency and resource sharing. By pooling their labor and skills, community members can accomplish tasks more effectively and complete them in a shorter timeframe. This not only benefits the recipient of the volunteer work but also enhances the overall productivity and resilience of the community.

- Additionally, changa reinforces the Ifugao people's profound connection to their rice terraces and their commitment to their preservation. It signifies a dedication to maintaining the infrastructure and agricultural facilities crucial for sustainable rice cultivation.

- Moreover, this practice is a testament to the value of reciprocity and social cohesion within Ifugao culture. By offering their time and expertise as volunteers, community members create a supportive network that strengthens community bonds and helps distribute the burdens and benefits of agricultural activities more equitably.

- In summary, changa, or the community volunteer work group, is a fundamental attribute of socio-cultural solidarity among the Ifugao people. It embodies the principles of shared responsibility, resource sharing, efficiency, and reciprocity. This practice not only reinforces the connection to the rice terraces but also underscores the importance of collective action in preserving their cultural heritage and sustaining their traditional way of life.

- **Bachang/Punbabaddang:** Bachang, also known as Punbabaddang, represents a deeply ingrained attribute of the value of community solidarity within the Ifugao culture. It refers to the spontaneous and collective action taken by community members to come together and provide assistance during times of disasters or overwhelming need. At its core, "baddang" encapsulates the concept of self-help within the context of the community relying on itself and its members in times of crisis, reflecting several important dimensions of community solidarity.

- First and foremost, bachang underscores the profound sense of interconnectedness and mutual support that exists within Ifugao communities. When faced with adversity, whether it be a natural disaster, a personal crisis, or any other overwhelming situation, community members unite without hesitation. This practice is a manifestation of their unwavering commitment to each other's well-being and the collective welfare of the community.

- Furthermore, bachang exemplifies the principle of shared responsibility. It signifies that the burden of addressing challenges or crises does not fall solely on individuals or external aid but is distributed among the entire community.

- This collective approach not only eases the challenges faced by those in need but also reinforces the bonds within the community. Moreover, bachang embodies the Ifugao people's self-reliance and resilience. Rather than solely relying on external assistance, they harness the collective strength, skills, and resources within their community to address pressing issues. This self-help ethos demonstrates their capacity to adapt and overcome difficulties, preserving their traditional way of life.

- Importantly, bachang is a living testament to the Ifugao people's commitment to preserving their cultural heritage and values. It reaffirms their dedication to maintaining their way of life and ensuring the well-being of their fellow community members.

- In summary, bachang or Punbabaddang is a profound attribute of community solidarity among the Ifugao people. It reflects their deep sense of interconnectedness, shared responsibility, self-reliance, and commitment to preserving their cultural values. This practice serves as a shining example of the strength and resilience of Ifugao communities, highlighting their ability to come together in times of need and uphold their cherished traditions and way of life.

- **Festivals (Modern context):** Contemporary Ifugao Community festivals stand as dynamic expressions of socio-cultural solidarity within the modern context of Ifugao society, and they continue to play a crucial role in preserving the unique cultural tapestry of the Ifugao people. While many of these festivals have evolved from traditional rice rituals, they have taken on new forms and significance that reflect the changing dynamics of the community and the enduring importance of the rice terraces. One of the remarkable aspects of contemporary Ifugao festivals is their roots in ancient rice rituals. These festivals have their origins in the rituals and ceremonies associated with the rice harvest, marking the culmination of months of labor in the terraces. As they have evolved over time, they have retained a deep connection to the rice terraces, serving as a reminder of the Ifugao people's enduring relationship with their agricultural heritage.

- These festivals celebrate not only the rice harvest but also the broader aspects of Ifugao traditional culture. They often incorporate music, dance, storytelling, and rituals that have been passed down through generations. By bringing these cultural elements to the forefront, contemporary Ifugao festivals serve as living repositories of Ifugao heritage, preserving and sharing the traditions that define their identity. One of the most significant aspects of these festivals is their ability to unite different Ifugao groups. While the Ifugao region is diverse, with various subgroups and dialects, these festivals have the power to transcend these differences. People from different parts of Ifugao gather together in the spirit of community, celebrating their shared cultural heritage and reinforcing the notion of being one Ifugao people. These festivals foster a sense of unity and solidarity that transcends geographical boundaries and differences in language or customs.

- Furthermore, contemporary Ifugao festivals play a critical role in promoting cultural continuity and resilience. They provide a platform for younger generations to actively engage with their cultural heritage, ensuring that traditions are passed down to future generations. These festivals also serve as a means of adaptation, allowing Ifugao culture to evolve while retaining its core values and principles.

- In essence, contemporary Ifugao Community festivals are a testament to the enduring strength of Ifugao culture and the commitment of the community to preserving its unique way of life in the context of the rice terraces. They bridge the gap between tradition and modernity, celebrating the past while looking toward the future. These festivals are not just events; they are living expressions of socio-cultural solidarity among the Ifugao people, reflecting their resilience, unity, and cultural richness.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