

## AN ETHICAL ANALYSIS OF ANDEAN WOMEN'S VULNERABILITIES AND HEALTH EQUITY IN THE FACE OF CLIMATE CHANGE

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### Rédaction

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### INTRODUCTION

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The urgency of taking action on the negative impacts of climate change on health is recognized globally. At the 28th UN Climate Change Conference (COP28) in December 2023, the COP 28 Declaration on Climate and Health was launched, aimed at advancing climate-resilient development, strengthening health systems, and building resilient communities for the benefit of present and future generations (World Health Organization, 2023). Reported impacts of climate change on human health include the adverse effects of global warming on the cardiopulmonary system and the gastrointestinal tract, an increase in waterborne diseases and infectious diseases such as typhus, cholera, malaria, dengue, and West Nile virus infection, as well as malnutrition due to the impact on food production and access to safe water (Franchini & Mannucci, 2015; Gardiner & Tubig, 2023; Haines et al., 2006). Although climate change affects all regions of the world, its negative effects exacerbate global health inequalities: Low- and middle-income countries (LMICs), as well as the most vulnerable groups whose capacity to adapt is the weakest, are more susceptible to diseases and physical injuries and mortality during natural disasters, such as floods and cyclones, brought on by climate change (Gardiner & Tubig, 2023; Haines et al., 2006). Climate change also interacts with gender inequalities, resulting in more negative health impacts on women, such as malnutrition and the incidence of infectious diseases (World Health Organization, 2012).

Such multifaceted vulnerabilities and their unequal distribution give rise to ethical issues of fairness and responsibility (Gardiner & Hartzell-Nichols, 2012; Gardiner & Tubig, 2023). As climate change is a global phenomenon with intergenerational effects, its spatial and temporal dispersion of cause and effect indicates that multiple actors, such as governments, the private sector, and society, have a moral responsibility to mitigate the impact of climate change concerning human health (Gardiner & Hartzell-Nichols, 2012; Singh, 2012). However, global tensions are present with the question of dispersed responsibility as well as fair sharing and equitable distribution of the benefits and burdens of climate change, adaptation, and mitigation policies and responsibilities to address them (Sheather et al., 2023). Particularly, challenges remain around questions of intergenerational justice (that is, what is owed to

future generations) and value conflicts between the human and non-human world (Sheather et al., 2023). In this context, key gaps on ethics, climate change, and human health are identified: a lack of an understanding of the importance of ethics in policy-responses to climate change, a shortage of ethical commentary on a range of key topics in environmental health literature, a lack of literature from LMICs, and limited discussion of inter-disciplinary ethics in relation to climate change (Sheather et al., 2023). In particular, specific action guiding ethical resources that provide practical pathways and policy options for researchers and practitioners are warranted (Sheather et al., 2023).

The development of ethical frameworks in health and climate change could help guide the actions of practitioners. One such example is the Declaration of Ethical Principles in relation to Climate Change adapted by the member states of the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2017. The six shortlisted principles, 1) Prevention of harm, 2) Precautionary approach, 3) Equity and justice, 4) Sustainable development, 5) Solidarity, and 6) Scientific knowledge and integrity in decision-making, were globally agreed based on the initial ten principles of adaptation and mitigation in climate change proposed by UNESCO and COMEST (World Commission on the Ethics of Scientific Knowledge and Technology) in 2015.

In the arena of gender mainstreaming in climate change adaptation and mitigation, Peru developed a national Gender and Climate Change Action Plan (GCCAP) in 2014 which recognized the disproportionate impact of climate change on women and the ways that it can exacerbate gender inequality (Ministerio del Ambiente & Ministerio de la Mujer y Poblaciones Vulnerables, 2015). Health is one of the eight priority sectors for which the action plan outlines specific actions and outcomes for mainstream climate change, gender, and intergenerational and intercultural approaches. During the development of the action plan, a series of participatory consultations took place to integrate the diverse views and needs of vulnerable populations, including rural and indigenous women. As a result, this initiative was hailed as a promising approach that empowered women to be agents of change: the approach was considered as a culturally informed response to the need to adopting a gender focus to address climate change vulnerabilities and their consequences on health, as well as inequalities in climate governance. By 2018, 18 gender-related activities were implemented while new mechanisms that incorporate women's and indigenous knowledge were established (NDC Partnership, 2019). However, implementing GCCAP faces challenges such as a lack of capacity to effectively integrate gender into programs in various sectors, some ministries' reluctance to consider gender policy as relevant, and inadequate budget allocations for gender-related actions (NDC Partnership, 2019). Moreover, Peruvian indigenous activists and scholars on climate vulnerabilities have called for a better understanding of the implementation context as a specific sociopolitical structure and processes: they argue that asymmetric power and multiple vulnerabilities based on race, ethnicity, class, and gender shape the multilayered vulnerabilities of indigenous populations, particularly women, to climate change and its impact (Alberto Acosta et al., 2020; Heikkinen, 2021).

In this regard, the present case study aims to reflect on the application of ethical principles in relation to climate change by contextualizing the vulnerabilities of Quechua women to climate change in the Department of Ayacucho, located in the south-central Andean highlands of Peru. We first review regional policies to examine the extent of climate change's impact on health, particularly women's health. Regional policies in relation to climate change adaptation that had been published in the past ten years (2015-2024) were identified through a Google search. Next, we explore sociocultural processes where women's traditional knowledge and cultural practices are practiced and shared in complex power dynamics within the community. We examine to what degree they are integrated into adaptation programs and planning in specific spatial and geographic conditions and a broad socioeconomic structure. Finally, by applying ethical principles included in UNESCO's Declaration of Ethical Principles

in relation to Climate Change, such as equity, justice, and fairness of an inclusive decision-making process using science and indigenous traditional knowledge, we discuss the importance of understanding the indigenous ways of living and knowledge that shape the specific vulnerabilities and capabilities of Quechua women in climate change adaptation planning and implementation.

The present case study was developed based on the first author's participant observation during her fieldwork in Ayacucho during 2016-2018. As a drought continued in November 2016, she noticed a change in the landscape of rural villages in Ayacucho. The concern over the potential impact on agricultural production was growing among local people, particularly smallholder farmers and their families. The village became half-empty as male farmers left for other cities to make money, while women were taking care of their children and herding animals. This experience prompted the first author (currently a postdoctoral researcher at McGill university) and co-authors living in Ayacucho to explore Andean women's vulnerabilities to climate change as well as their traditional knowledge, cultural practices, and decision-making in the particular socio-cultural context, while reviewing the relevant regional policies and reflecting on globally-agreed ethical principles relation to climate change.

## IMPLEMENTATION OF POLICIES FOR CLIMATE CHANGE AT THE REGIONAL LEVEL

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### Context

The region of Ayacucho, with a population of 616,176 spread over 43,821 km<sup>2</sup>, is located in the south-central part of Peru at an altitude of 2,700 m above sea level. According to Sistema Nacional de Evaluación (2020), 81.2% of the inhabitants identify as Quechua. Ayacucho was severely affected by the 20-year-long (1980–2000) political violence between the communist militant group *Sendero Luminoso* and the state military, making it one of the four regions most impacted by this conflict. Additionally, it has been marked by persistent underdevelopment and poverty, ranking as one of the five poorest regions in the country (Instituto Nacional de Estadística e Informática, 2022). The major economic activities in the region include agriculture and fishing, which account for nearly 50.1% of the population's employment, followed by commercial business at 12.5% (Sistema Nacional de Evaluación, 2020).

In Andean society, where the family is at the core of production, women bear the major share of responsibility for ensuring the survival, welfare, and health of their families. They support agricultural work and animal herding while sustaining families by preparing food, caring for animals and children, maintaining food, and securing the health of family members (Zapata Velasco et al., 2008). In the family and community space where *machismo* has shaped patriarchal gender relations, Andean women, particularly in rural areas, face numerous barriers that prevent them from accessing their rights to education, health, equal treatment, and a life free from violence (ONAMIAP, 2020). For instance, 20.1% of women in Ayacucho are reported to be illiterate, compared to 6.1% of men (Instituto Nacional de Estadística e Informática, 2018). Beyond the family space, women often take on subsidiary roles, whereas men occupy leadership positions in community decision-making (Távora & Lykes, 2022). Most women are restricted from controlling the land, being represented by either their husbands or fathers in the community council (Távora & Lykes, 2022). Such patriarchal practices are also often manifested in the form of gendered violence: The prevalence rate among women aged between 15 and 49 who have experienced physical and/or sexual violence by husbands or partners in Ayacucho is 10.4%, compared

to 7.6% at the national level (Instituto Nacional de Estadística e Informática, 2022).

## Problem

### *Lack of consideration of gender in climate change policies*

A range of reported and likely effects of climate change on the population's health are found in regional policies related to health, environment, and development. As a consequence of changes in temperature and rainfall patterns, more frequent occurrences of flooding, prolonged droughts, and frost are reported. In the Ayacucho region where subsistence farming is the major income-generating activity, changes in rainfall patterns directly affect the use of natural resources, food production, and access to water for human consumption (Centro Nacional de Planeamiento Estratégico-CEPLAN, N.D.; Gobierno Regional de Ayacucho, 2015). The health-related effects include malnutrition due to food insecurity, limited access to water due to migration from rural to urban areas, and an increase in infectious diseases (Gobierno Regional de Ayacucho, 2015). Additionally, torrential rain that causes flooding of local health centers interrupts the provision of primary healthcare services (Cabrera, 2015). Moreover, the adverse effects on production can affect the local development of rural areas in particular, exacerbating existing socioeconomic inequality (Centro Nacional de Planeamiento Estratégico-CEPLAN, N.D.). The *"Documento Prospectivo: Ayacucho 2030"* that analyzed the current socio-economic and development conditions of the region stated that persistent inequality, social exclusion, and the high poverty rate can result in dissident ideologies, which might lead to sociopolitical conflict (Centro Nacional de Planeamiento Estratégico-CEPLAN, N.D.).

On the other hand, "gender" does not appear to be addressed in the retained policies, even though it shapes different degrees of vulnerability to the adverse effects of climate change, varied health impacts of climate change between men and women, and dissimilar adaptive capacities to cope with and reduce the negative impact of climate change on health (World Health Organization, 2012). For instance, the *Documento Perspectivo Ayacucho 2030* (N.D.) only mentioned that "sectors more affected [by climate change] will be in the rural areas, especially agricultural activities, such as females, children, elderly people, and people with disability" while acknowledging that "gender-related problems persist due to cultural nature since they are not addressed from the home and the educational system."

In March 2023, the regional government approved an ordinance titled *"Creación, Instalación y Funciones de la Plataforma Regional de Pueblos Indígenas para Enfrentar el Cambio Climático"* to create "a space for indigenous people for management, articulation, exchange, systematization, diffusion, and follow-up of their proposals of adaptation and mitigation methods, and also of knowledge, practices, traditional and ancestral knowledge on climate change that contribute to the integral management of climate change." Following the approval of the ordinance, the Regional Federation of Indigenous Women of Ayacucho (Federación Regional de Mujeres Indígenas de Ayacucho, FEREMIA) was created to serve as a regional base of the National Organization of Andean and Amazonian Indigenous Women of Peru (ONAMIAP). The success of the federation's gender mainstreaming in climate change adaptation planning and implementation is still unknown. The lessons learned from the implementation of a national Gender and Climate Change Action Plan suggest the need for the right institutional mechanisms that challenge the male dominated attitude that tends to see gender issues as women's problems (NDC Partnership, 2019).

### *Multifaceted impact of climate change on individual health, family, and community*

A range of physical and mental health impacts of climate change are experienced by the rural population of the Andean highlands (Gonzales et al., 2014; Wauben, 2020). At an individual level, headaches and fatigue from excessive heat can affect the physical health of both men and women involved in labor-intensive agriculture and livestock farming on their “*chacra*” (small plot of land). Flooding caused by heavy rain can lead to respiratory diseases, while the use of contaminated water stored in buckets due to water scarcity is linked to waterborne illnesses. Additionally, “*preocupación*” (constant worrying) over the negative impact of climate change on the household economy, such as low agricultural production due to water scarcity, affects mental well-being.

At a family level, economic hardships lead to temporary internal migration of men to neighboring cities, such as Huamanga, Ica, and Lima, and occasionally to the wilderness of the Valle de Ríos Apurímac, Ene y Mantaro (VRAEM) (San Francisco and Pichari), the valley known for coca production, and Andahuaylas regions. These individuals are involved in physically demanding labor, such as construction, informal businesses, livestock, and agriculture, to generate income. Such familial separation creates additional work and responsibilities for women as caregivers during the breadwinner’s absence.

Climate change also affects the critical role of women in maintaining food security in the community. Phenomena such as drought, exacerbated due to climate change, affect agricultural production and lead to the loss of some traditional customs practiced in the Andean rural communities, such as “*trueque*” (barter). *Trueque* is a traditional form of procuring food by exchanging products and goods, which is primarily performed by women. For instance, a woman from a rural community exchanges the product she has harvested, such as wheat, barley, corn, or potatoes, for fruit brought by another woman from the city, or for coca or bread. This form of exchange takes place based on reciprocity and complementarity in an intimate space (Martí & Pimbert, 2007). Even though this has been an important strategy in terms of food procurement at the household level, the recent increase in drought has resulted in reduced agricultural production. As a result, what is harvested can only be saved for self-consumption, leaving little to be set aside for exchange. Since they do not have enough products for *trueque*, more families are beginning to purchase food. Faced with a shortage of production, some people no longer see it as beneficial to plant crops. Consequently, more men dedicate themselves to other activities such as construction, and more young people are migrating to urban areas. This change in agricultural production and the internal migration of men also hinders the continuation of traditional practices such as *trueque*.

In the Andean cosmovision, people’s health and well-being are closely linked with *Allim kawsay* (good life), built on reciprocity through the *Uywanaku* (caring coexistence) and *Parlanakuy* (space of conversation and discussion). In the Andean socio-cultural context where values of care and reciprocity are practiced in everyday life, a healthy body is strongly related to social relationships that are nurtured through the sharing of food and drink among families and community members (Greenway, 1998; Huambachano, 2019). However, Quechua women’s health and well-being is susceptible to strain from constant worrying and pressure due to the increasing threat to their social role of maintaining family food security, changes in family and community relations, and decreased connection to cultural practices due to climate change impacts.

### *Andean women’s roles, knowledge, and decision-making*

In addition to their role in sustaining food security through cultural practices, the Andean women have

acquired knowledge and technical skills in the selection and conservation of seeds for crops such as potatoes and maize (Sarapura–Escobar & Hoddy, 2022; Tapia & Torre, 1998). They often determine which plant resources to conserve and use, which seeds to select, which crop varieties to grow, and which food products to keep for home consumption and which to sell at the local market (Sarapura–Escobar & Hoddy, 2022; Tapia & Torre, 1998). In addition, women play an important role in transmitting their knowledge as biodiversity keepers to younger generations, which is critical for the survival of the family and the retention of culture (Sarapura–Escobar & Hoddy, 2022; Tapia & Torre, 1998). Rural women are also involved in the care of herd animals such as alpacas, sheep, and llamas, which are important income sources. They accumulate experiential pastoralist knowledge and practice, bringing animals to pasture, monitoring signs of distress and illnesses, as well as reproduction, and treating animals when they are sick (Caine, 2021; Zapata Velasco et al., 2008). Women inform community decisions to shift their herds between pastures, guided by their expertise on seasonal patterns of rain and temperature as well as daily observations of animals' health and behavior (Caine, 2021; Zapata Velasco et al., 2008).

On the other hand, women are often excluded from adaptation discussions and development project planning, dominated by men with better access to educational opportunities to acquire proficiency in Spanish and technical terms for illness and treatments for animal health (Caine, 2021; Sarapura–Escobar & Hoddy, 2022). In rural communities, women who only speak Quechua are “muted” and feel intimidated to speak up in community assemblies where male leaders use Spanish to discuss important things (Barrig, 2006). Speaking Quechua in public spaces is associated with stigma and feelings of inferiority (Funegra, 2011). Besides the power marked by the use of Spanish, women's decision-making power in the community is entangled with intersecting social identities such as age and education. Older women without formal education who speak Quechua safeguard their experiential knowledge and practice the culture according to the cosmovision perspectives, passing knowledge and traditions to younger women. Although they are highly valued in the communities, they are not considered in policies and programs (Sarapura–Escobar & Hoddy, 2022). Long-standing patriarchal exclusionary relationships are reinforced by obstructing less educated women from engaging with external actors, such as development programs and government officials. However, younger, educated women are beginning to acquire decision-making power despite their age, while introducing new activities to promote equity in community planning (Sarapura–Escobar & Hoddy, 2022).

## **DISCUSSION**

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### **Reconsidering Andean women's vulnerability to climate change**

Acknowledging women's greater vulnerabilities and focusing on their empowerment is promoted as a way to recognize equity and justice, as stated in Article 10 (Vulnerable Groups) of the UNESCO Declaration of Ethical Principles in Relation to Climate Change (2017). Under the principles of equity and empowerment of vulnerable groups in Article 10, states and other relevant actors are called upon to facilitate and encourage public awareness and participation in decision-making and actions by making information and knowledge on climate change, as well as the means to implement mitigation and adaptation actions, accessible and available to the most vulnerable (UNESCO, 2017). The importance of women's voices in decision-making is stressed in this principle because women are disproportionately affected by climate change and tend to have fewer resources due to sociocultural norms and gender

differences in access to resources in a specific socioeconomic and cultural context (UNESCO, 2017; World Health Organization, 2012). Women's meaningful participation in the planning, design, and implementation of climate change adaptation and mitigation processes can allow their experiences, knowledge, and concerns to be integrated in more environmentally-friendly policies and practices, while promoting gender equality and equity (World Health Organization, 2012).

Consideration of gender in decision-making requires understanding of how women's vulnerability is produced by the configuration of social relations of power in particular contexts beyond generalizing women as a vulnerable group (Arora-Jonsson, 2011). To this need, feminist perspectives of vulnerability bring attention to socio-economic and political structures that reinforce conditions of vulnerability. According to Rogers et al. (2012, pp. 24-25), vulnerabilities have three distinct sources: 1) Inherent vulnerability is derived from "sources of vulnerability that are inherent to the human condition and that arise from our corporeality, our neediness, our dependence on others, and our affective and social natures," 2) situational vulnerability which is "caused or exacerbated by the personal, social, political, economic, or environmental situation of a person or social group," and 3) pathogenic vulnerability which "may be generated by morally dysfunctional interpersonal and social relationships characterized by disrespect, prejudice, or abuse, or by sociopolitical situations characterized by oppression, domination, repression, injustice, persecution, or political violence." In the Peruvian Andean highlands, vulnerability of smallholder communities is not only a question of exposure to climatic risks but is also influenced by complex sociopolitical processes across multiple scales as well as by political history of marginalization and discrimination of indigenous peasant communities (Heikkinen, 2021). Particularly for women, family malnutrition facing Andean children due to climate change is not simply a lack of access to food; it is related to the situational and pathogenic vulnerability of Andean women who are struggling to meet other basic needs of their children such as education in the context of poverty and cultural discrimination against women due to machismo that implies male superiority and promotes male dominance in everyday life (ONAMIAP, 2020). In order to address this marked vulnerability, simply calling for responses to the needs of vulnerable groups as stated in the Article 10 of the UNESCO Declaration of Ethical Principles may mask the real problem underlying the complex gender inequality as well as denies their agency (Arora-Jonsson, 2011; Huyer et al., 2020).

## **Andean cosmovision and local traditional knowledge**

As a few regional documents recognize the loss of ancestral knowledge and cultural practices as an impact of climate change, local traditional knowledge is an important component of climate change adaptation and mitigation policies and practices in Ayacucho (Centro Nacional de Planeamiento Estratégico-CEPLAN, N.D.; Gobierno Regional de Ayacucho, 2015). In Andean culture, community people commonly say, "*Kawsaypachapiqa lliwmi kawsan*" (In the world of the living, everyone has life) (Zapata Velasco et al., 2008). This indicates the Andean cosmovision that the *Pacha* (mother earth) or the World is a place where not only human beings but also everything in nature, such as rocks, hills, plants, rivers, forests, mountains, and animals, are considered as living organisms. Considering the *Pacha* and all that is necessary for the flow of life (*Kawsay*), including *Runas* (Human beings), fauna and flora, and *Wamanis* or *Apus* (Deities), being tied and complementary to each other extends care and respect for the environment (Allison, 2017; Huambachano, 2019). With this Quechua view of the world, women have nurtured knowledge of care, which fosters and maintains bonds of reciprocity and mutual care and protection in their daily living, as called "*uywanakuy, nanachinakuy*" (caring and being cared) (Huambachano, 2019). In the *Pacha* where human beings and nature are inseparable, women have continued contributing to their sustainable farming practices that manage native crops, including

choosing appropriate planting dates and practicing festivities to give thanks to nature and strengthen a collective support system in the community (Tapia & Torre, 1998).

The capabilities approach sheds light on Andean women's reciprocity and care of living beings and nature as their alternative ways of responding to vulnerability facing their family and community. The capabilities approach proposed by Sen and Nussbaum uses the concepts of "capabilities" and "functionings": functionings are what a person is able to do and be in a given position of the background context, whereas capabilities are how opportunities and choices are afforded and enable the individual to achieve well-being and development (Nussbaum, 2000). Capabilities also recognizes what individuals are able to be and do in their lives by converting available resources, as well as surrounding physical and social conditions, to opportunities (Nussbaum, 2000; Venkatapuram, 2013). Extending capabilities approach, Venkatapuram's capability to be healthy further contends the importance of one's agency and skills to convert their own endowments and needs, and external social and physical conditions, into health functioning (Venkatapuram, 2013).

When the capabilities approach is applied to climate change adaptations, tapping into existing resources, knowledge, and the ability to use resources sustainably and choose one's desired conditions is considered as a more just strategy (Moulton & Carey, 2023). In the Andean environment, Quechua ways of knowing (*Yachay*) are associated with the collective capacity to nurture, which is an attribute of all living organisms in the *Pacha* (mother earth) (Huambachano, 2019). Elderly persons are considered to have more wisdom as a fruit of their experiences to share and teach others in the community. Building on the Quechua concept of reciprocity *Ayni* (a reciprocal work exchange arrangement at the family level), Andean women's experiential knowledge, and the ability to make decisions in everyday life to prioritize local communities and networks of care could be leveraged not only for transformative adaptation but also for fulfilling individual and community well-being (Allison, 2017; Moulton & Carey, 2023; Sarapura–Escobar & Hoddy, 2022).

## **Women's intersectional identities and decision-making power**

To promote health equity, providing equal opportunities for women to participate in planning, designing, and implementing health adaptation and mitigation processes can be an essential part of the strategy (World Health Organization, 2012). However, because of their position in their communities, women's voices oftentimes have less influence, and they have limited access and control over resources. Machismo generates feelings of fear and insecurity among Andean women because of how their partners treat them: Such feelings make women anxious about speaking in public or expressing their ideas to unfamiliar people, and some even hold back from experimenting or learning something new as they doubt their capability (Távora & Lykes, 2022).

Despite the dominant influence of machismo, women's intersecting identities define nuanced degrees of power that each woman has in decision making in their communities. Rural women differ by gender, class, education, household headship, age, and stage of life, and their knowledge is affirmed to different degrees (Huyer et al., 2020; Sarapura–Escobar & Hoddy, 2022). As such, knowledge-sharing and decision-making are embedded in a complex web of relations, interactions, and power dynamics shaped by individual and social identities (Sarapura–Escobar & Hoddy, 2022). Therefore, even though there is a strong call for gender mainstreaming in climate adaptation strategies, insufficient understanding of such cultural practices and interaction dynamics within socio-ecological systems may shift the focus away from the root causes of deep-seated structural gender inequalities (Acosta et al., 2021).



## Epistemic Injustice and Hierarchies of knowledge

In the field of ethnobiology, a recent debate questioned about whether local and traditional knowledge systems are practiced due to less-advantaged circumstances such as poverty and deprivation (Abdullah & Khan, 2023; Hartel et al., 2023). Within this discussion there have been calls for building science with justice and inclusiveness (Hanazaki, 2024). To do so, paying attention to how local, traditional, and indigenous knowledge is positioned in the overall knowledge system is crucial. “Scientific knowledge and integrity in decision-making” is another ethical principle (Article 7) included in the UNESCO Declaration. This principle aims to enhance the social processes through which science disseminates its findings for the benefit of all and informs decision-making and policies for the implementation of relevant long-term strategies (UNESCO, 2017). As such, scientists are expected to play an important role in filling the knowledge gap in climate change, actively following strategies, and communicating with policymakers as well as the public (UNESCO, 2017). In parallel, the Declaration also draws attention to traditional indigenous knowledge, stating “Decisions should be based on, and guided by, the best available knowledge from the natural and social sciences, including interdisciplinary and transdisciplinary science, and by taking into account, as appropriate, local, traditional and indigenous knowledge” (Article 7) (UNESCO, 2017).

As seen in the Declaration’s principle, a strong emphasis on scientific knowledge as evidence to informed decision-making in environmental management policy and practices risks creating a dichotomy between academic ecological knowledge and traditional indigenous knowledge, thus further marginalizing the latter (Hanazaki, 2024; Ludwig & El-Hani, 2020). Despite efforts to integrate local traditional knowledge, as long as academically trained scientists have the power to decide when to incorporate local knowledge into research and adaptation planning, unequal power relations will remain (Byskov & Hyams, 2022; Ludwig & El-Hani, 2020).

Recognizing the existing knowledge hierarchy that underrepresents indigenous knowledge, commentators have described many climate adaptation policies as being epistemically unjust towards indigenous people (Byskov & Hyams, 2022). Fricker’s (2007) notion of epistemic injustice includes two underlying forms of injustice: 1) testimonial injustice occurs when the credibility of the knowledge holder is denied due to prejudice of the receiver of knowledge against an aspect of their social identity such as race, gender, and disability, and 2) hermeneutical injustice happens at the systemic level where certain people are marginalized when they are excluded from shaping shared social meaning of human experiences due to a lack of epistemic resources to convey their knowledge with existing language. For instance, hermeneutical gaps occur when indigenous cultural and spiritual claims do not map onto available categories within the Western legal system (Tsosie, 2017). Both forms of epistemic injustice are seen in the Peruvian Andean context where, several climate adaptation policies and strategies continue to ignore the interests and knowledge of indigenous peoples (Byskov & Hyams, 2022; Fricker, 2007). Historically, in Peru, both indigenous and peasant cosmologies were considered “primitive” and neglected as a barrier to modernity (Heikkinen, 2021). Today, government officials see indigenous farming practices as inefficient and outdated (Heikkinen, 2021). Due to testimonial injustice, the dominant discourse on development that promotes capacity building and technical assistance fails to recognize Andean smallholder farmers’ agricultural knowledge that has been used for adaptation.

Furthermore, misrecognizing the value of indigenous knowledge occurs due to hermeneutical injustice where epistemic and ontological differences make it hard to communicate their knowledge to be understood within the dominant climate adaptation discourse (Byskov & Hyams, 2022). Quechua language plays a key role in articulating and transmitting indigenous people’s knowledge based on Quechua’s cosmovision, which stresses the reciprocal relations and interactive practices between

humans and nature: unique wisdom about plants, animals, and water systems are transmitted through oral histories while living on *Pachamama* (Mother Earth) (Huambachano, 2019). However, Quechua's holistic understanding of nature is often hindered by the dominant Western paradigm of nature that sees the environment as existing independently from human beings as well as stigma associated with speaking Quechua in public space (Funegra, 2011; Huambachano, 2019).

As such, while scientific evidence and advancement are critical for climate adaptation policies, it is imperative to recognize how the current climate language and discourse are skewed toward Western scientific approaches to facilitate the integration of indigenous knowledge and practices (Byskov & Hyams, 2022). As smallholder farmers in the Andes have been historically socioeconomically disadvantaged in Peru and still suffer from persistent impoverishment and marginalization, addressing the socioeconomic inequalities underlying the prejudices is required by engaging with Quechua communities as equal members of society and respecting their ways of living and emic knowledge (Byskov & Hyams, 2022; Hanazaki, 2024).

## **CONCLUSION**

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In this case study, we found limited attention and action to address the disproportional impact of climate change on women's health in Andean regional policies. This finding suggests a lack of consideration of gender inequality and reinforces the need for gender mainstreaming in regional climate change policies. However, exploring Quechua women's knowledge and practices of care in family and community life reveals specific spatial, temporal, and geographic conditions and their impact on women's capabilities to transmit and apply knowledge based on the Andean cosmovision, which contribute to sustaining individual and community well-being (Allison, 2017; Huambachano, 2019; McGregor, 2004). Since their way of acquiring and sharing knowledge is based on interacting with the environment through mutually supportive relationships, simply applying the principles, such as "justice and equity" and "scientific knowledge and integrity in decision-making" as presented in the UNESCO Declaration of Ethical Principles may neglect context-specific vulnerability as well as existing local and traditional knowledge systems as part of their capabilities. When responding to the need for identifying health-related policy options and pathways for gender mainstreaming in climate change, "one must start with Indigenous people and our own understanding of the world" (McGregor, 2004, p. 386).

Furthermore, in the discourse of equity and justice, monolithically considering women as being vulnerable may overlook situational and pathogenic vulnerabilities that are generated by inherent cultural practice of *machismo*, as well as long-standing socio-economic inequality and discrimination rooted in colonial history (Rogers et al., 2012). Andean women's power in knowledge-sharing and decision-making are linked to intersectional identities, such as age, class, education, and household headship, shaping who benefits and who is excluded from policies and resource allocation (Moulton & Carey, 2023; Sarapura–Escobar & Hoddy, 2022).

Some regional policies raised concern over the loss of ancestral knowledge and cultural practices as consequences of climate change. However, when climate change has shifted environmental debate and action to scientific knowledge, male technocrat-dominated debate and policymaking often mask socioeconomic structural dimensions contributing to epistemic injustice (Huyer et al., 2020). The epistemic injustice of failing to recognize indigenous knowledge within local climate adaptation policies and projects risks further marginalizing not only Quechua women but also the community as a whole, who have been historically discriminated against and socioeconomically disadvantaged (Byskov &

Hyams, 2022; Hanazaki, 2024). In the case of the Andean highlands, despite multifaceted vulnerabilities to the health impact of climate change, Quechua women's experiential knowledge is nurtured and shared through practices of care. In the cultural context that values reciprocity with interdependent others and nature, women's knowledge helps maintain food security and sustainable use of natural resources in the family and the community. Such understanding of the particularities of local lived experiences and ways of knowing and values that are rooted in history and culture can reorient ethical reflection on women's vulnerabilities to climate change.

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