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Conceptualizing gendered vulnerability to climate change in the Hindu Kush Himalaya: Contextual conditions and drivers of change

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ABSTRACT

Not all women or all men are equally vulnerable. Manifestations of vulnerability to climate change vary in different groups of people, based on their position in a social and gender structure in a particular location and at a particular time. We need to understand the pre-existing conditions, what we term "contextual conditions" that underlie experiences of vulnerability and lead to its complexity and reproduction. This paper is based on a literature review and takes the standpoint that not only is gender a powerful and pervasive contextual condition, but that it intersects with other contextual conditions to shape vulnerabilities. Further, gender and other contextual conditions also influence and are influenced by socioeconomic drivers of change to produce differential gendered vulnerabilities. Therefore, manifestations of gendered vulnerability to climate change are the result of complex and interlinked factors, which cannot be simplified for the sake of efficiency. This paper offers a conceptual framework bringing together these interlinkages and intersectionalities in understanding differential gendered vulnerabilities.

1. Introduction

Climate change is unequivocal and no longer a future phenomenon, but rather a present and real threat that is currently being experienced (Baird, 2008; MacGregor, 2010; Pachauri et al., 2014). This has resulted to a paradigm shift, whereby most working in the field of climate change no longer question whether climate change is happening. Rather, they seek to understand what climate changes are being experienced, expected and where they are found; what the felt and anticipated impacts are; who is and will be impacted; and how adaptation is occurring and can occur (MacGregor, 2010).

While there is a growing body of research into the impacts of climate change on society that particularly recognizes the differential and unequal impacts of climate change on women and men, "the picture is far from complete" (Skinner, 2011: 36) as there is less understanding of how and why these unequal impacts and differential vulnerabilities occur. Understanding these unequal impacts and differential vulnerabilities of women and men to climate change is argued to support adaptation (Neumayer, Plümper, 2007), yet it is difficult to generalize our understanding of the differential vulnerabilities, as they are context specific. Vulnerabilities resulting from climatic stressors are not only the result of changes in climate, but rather manifestations of interlinkages and intersections of the contextual conditions (viz. social and gender, political, economic and geographical location) and socioeconomic drivers of change such as globalization, urbanization, and technological and infrastructure development. However, vulnerabilities to climate change are often studied in isolation by compartmentalizing the various interlinked contextual conditions and other

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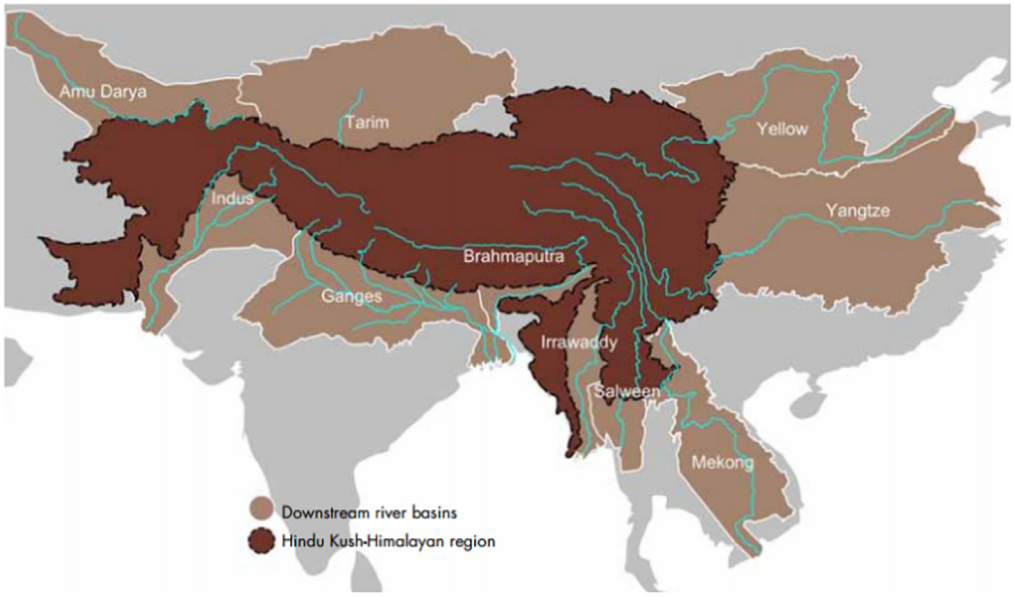

Fig. 1. Rivers and downstream river basins of the HKH.
Source: Singh et al. (2011)

socioeconomic drivers of change. Due to such focus only on climatic stressors, gendered vulnerabilities to climate change are frequently studied with respect to disaster and hazards (Brooks, 2003); little knowledge exists of the gendered impacts of gradual climatic changes, which are closely linked to socioeconomic factors.

This paper takes the approach that gender, which is a social structure, is a pervasive contextual condition that intersects with other contextual conditions, and with socioeconomic drivers of change, to create conditions of vulnerability. Therefore, manifestations of gendered vulnerability to climate change are the result of complex and interlinked factors which cannot be simplified for the sake of efficiency. Simplification leads to the danger of missing important and critical nuances which could be the underpinning for effective adaptation policy and practice.

We offer a conceptual framework that combines the interlinkages and intersectionality of contextual conditions and socioeconomic drivers of change in both understanding gendered vulnerabilities and addressing these issues while preparing plans and policies. The ultimate goal, as articulated by Liverman (1990: 29) is "not to further the semantic or theoretical debate" but rather to understand the underlying causes of why particular groups and individuals are more vulnerable to climatic change.

Following this introduction, Section 2 gives a brief background of the Hindu Kush Himalaya (HKH) region and its people in changing climatic conditions. Section 3 unfolds the conceptual framework, and Section 4 summarizes the discussion in terms of gendered vulnerabilities and lays out the potential usefulness of the framework.

2. The Hindu Kush Himalaya, its peoples and changing climate

The HKH region, which includes the entire countries of Nepal and Bhutan and the mountainous regions of Afghanistan, Pakistan, China, India, Bangladesh and Myanmar, covers a distance of 3500 km and covers an area of around 4.3 million km^2 (Singh et al., 2011; Zomer et al., 2009). Ten of Asia's major rivers originate from the region (Fig. 1), providing freshwater not only to the mountain people but also to those living downstream.

The region has an opulent and wide diversity of natural resources. However, this biological and natural richness is offset by geological fragility and geographical isolation. The upshots of this mountain-specific biophysical condition of fragility and isolation are poor physical and economic infrastructure; poor access to markets, technologies and information; poor institutional services; and limited economic opportunities (Fang and Leduc, 2010). Consequently, most people here are marginalized and are among the poorest in the region living on subsistence level. According to a report by the International Centre for Integrated Mountain Development (ICIMOD), 31% of the population of the HKH live below the poverty line (Hunzai et al., 2011). Poverty in the region generally manifests in low income, ill health, poor access to health facilities, malnutrition, poor education, low skills, high dependence on natural environment, high insecurity (due to political disturbances which are often violent, the insecurity is also due to the topography and physiology of the region that is prone of numerous natural hazards and risks, physical vulnerability, drudgery, and limited capability and capacity for enterprise (Karki et al., 2011) Fig. 2.

From time immemorial, mountain people have learned to adapt to changing seasons and extreme weather conditions (Leduc and Shrestha, 2008). Throughout history they have been exposed to conditions of too much or too little water, and the regular disaster

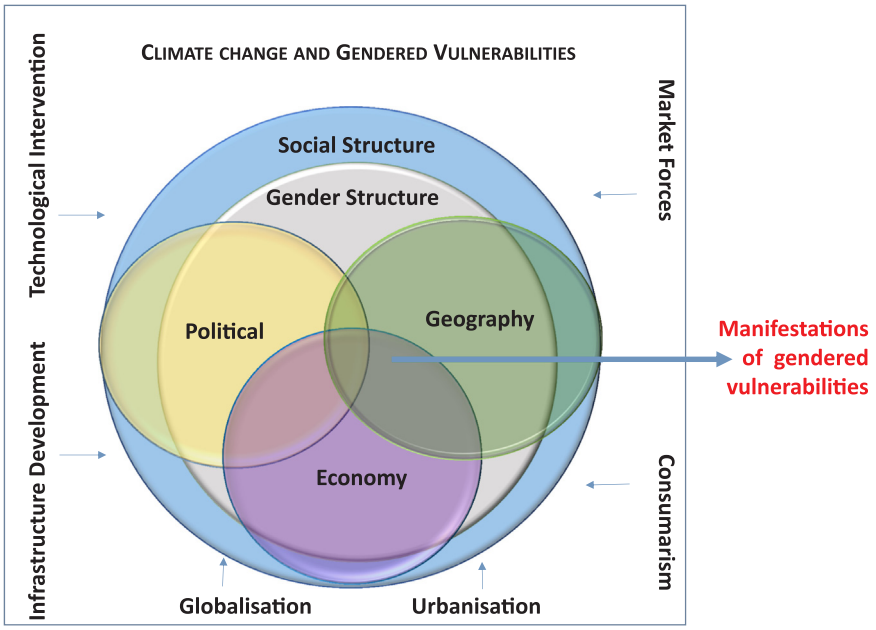

Fig. 2. Conceptual framework on Climate Change and Gendered Vulnerabilities.

events that such conditions bring about (Klatzel and Murray, 2009; Rhoades, 2007; Tsering et al., 2012; UNEP, Nellemann, 2004). The difference now is that the intensity and frequency of such stress events have increased. It is anticipated that climate change will have a significant impact in the HKH region owing to disruptions to the "fine equilibrium of snow, ice and water" (Kulkarni et al., 2013: 142).

There is limited reliable information on climate parameters in the HKH, as there are few climate stations in the region (Chettri and Sharma, 2016), but studies show that the region experiences above-average warming and climatic variability. Since the 20th century progressive warming at higher altitudes of the Himalayas has been 3–5 times greater than the global average (Karki et al., 2011; Liu and Chen, 2000; Shrestha et al., 1999; Yao et al., 2007). Kraaijenbrink et al. (2017) project that a global temperature rise of 1.5 °C will lead to warming of 2.1 ± 0.1 °C in the high mountains of Asia, including HKH.

There is less clarity in historical precipitation trends (Bhutiyani et al., 2010; Shrestha et al., 2000), yet it is acknowledged that rainfall patterns are changing, with an increase in the frequency and intensity of rainfall events, and changes in the timing and length of the monsoon period (Goswami et al., 2006; Ramesh and Goswami, 2007). Lutz et al. (2014) have projected that until mid-century there will be an increase in run-off due to increased precipitation in the upper Ganges, Brahmaputra, Salween and Mekong basins, and accelerated melt in the upper Indus Basin. There is likely to be less water in the Indus, Tarim, Yangtze, Brahmaputra and Amu Darya rivers later in the century owing to loss of glacial melt (Xu et al., 2009). Thus, climate change has major implications for water availability, making "it more uncertain, both in time and space" (Sharma et al., 2009: 2). Such changes would have acute effects on natural ecosystems, as well as on people's livelihoods and wellbeing (Chettri et al., 2014; Mertz et al., 2009).

In addition, the changing socioeconomic contexts, especially those driven by external factors that have come about due to rapid changes in society, such as market forces, infrastructure development, etc., have weakened the ability of communities to adapt as before. While there is little research in this field, there are "indications that knowledge and practices that once contributed to reducing vulnerabilities are eroding in the face of cash incentives and needs, and livelihood diversification" (Hewitt and Mehta, 2012: 4). There is limited understanding on how the effects of climate change will impact the geographically diverse mountain ecosystems and, in turn, the complexity of the lives, livelihoods, resources and wellbeing of diverse communities in the region.

3. Conceptualizing gendered vulnerabilities to climate change

While the earliest meaning of "vulnerability" is the capacity to be wounded (Füssel, 2007) the term has evolved over time, taking on diverse and contested sets of meanings within climate change research and practice (Adger, 2006; Malone, 2009). Until the 1980s the definition of vulnerability was associated with exposure to biophysical risks (Adger and Kelly, 1999; Hewitt, 1983). A paradigm shift began with Wisner (1978) and Hewitt (1983) with a growing recognition that the impacts of hazardous events, even within small geographic areas, are not homogenous. Apart from the biophysical characteristics of an event that determine vulnerabilities, there are also deep social features. Social vulnerability take into account not only the biophysical aspect but also the pre-existing internal conditions and social structures that determine social positioning of an individual/group resulting in differential impacts of a hazard (Dow, 1992; Gerlitz et al., 2014; Hewitt, 1983). A crucial facet of vulnerability is gender, and the recognition that women and men experience climatic change and associated hazard events differently (Aguilar, 2009, 2013; Hemmati and Rohr, 2009; Lambrou

and Piana, 2006; Terry, 2009). Furthermore, the impacts of the changes can further exacerbate already existing inequalities, and these in turn can compound the vulnerabilities of those who are in a subordinate position in the social and gender structure (Bennett, 2005; Brody et al., 2008; Neumayer, Plümper, 2007).

Although women and girls in general face more negative impacts in hazardous events, this does not mean that women are inherently vulnerable to such events (Arora-Jonsson, 2011; Dankelman, 2002; Lambrou and Nelson, 2010; Nellemann et al., 2011; Sultana, 2010). As articulated by Wisneret al. (2003: 16), "it is not female gender itself that marks vulnerability but rather gender in a specific situation". Gender and gendered difference are socially constructed, reflecting the legitimized social and cultural norms at a particular spatial and temporal juncture.

These constructions are not constant, but change over time and space to reflect evolving realities (Butler, 1988; Sogani, 2013; Sultana, 2010; Tschakert, 2012; West and Zimmerman, 1987). Gendered experiences are not homogenous, and the practice of binarizing gendered experience to simplistic experiences of only male and female – as often seen in development projects, for instance in terms of the construction of the "Southern woman" (Cornwall, 2001; Mohanty, 1988), and more recently "mountain women" (Joshi, 2014) – is problematic. Such a simplistic approach ignores the critical issue of power relations that are determined by the social context (Arora-Jonsson, 2011; Carr and Thompson, 2014; Demetriades and Esplen, 2008; McCall, 2005; Rodenberg, 2009).

Recognizing that gender intersects with other axes of social differentiations (e.g. ethnicity, age, class, caste, health and disability), resulting in a mutually constitutive identity (Barager, 2009; Davis, 2008; Kabeer, 2015; Yuval-Davis, 2006), the framework takes the intersectionality approach, which is a feminist sociological concept introduced by Crenshaw (1989). "Intersectionality is the specific combinations of the intersecting axes of social differentiations that shape social and gendered positions, and lived experiences" (Osborne, 2013: 131). When integrating gender into an understanding of vulnerability to climate change impacts and disasters, it is critical to ensure "more agile understandings of women and men" (Resurrección, 2013: 41) that reflect how gendered experiences are the outcome of such intersectionality (Aguilar, 2009; Ahmed and Fajber, 2009; Arora-Jonsson, 2011; Mitchell et al., 2007; Nightingale, 2011). In addition, this conceptual framework combines perspectives of the social relations approach (SRA), the feminist political ecology (FPE) and the vulnerability framework of the pressure and release model (PAR).

The SRA emphasizes an analysis of relationships between people, their relationships to resources and activities, and how these are reworked across institutional levels in specific contexts – from the household to formal and informal institutions including the state and the market (Kabeer, 1994; Kabeer and Subrahmanian, 1996: 25). The SRA departs from narrow, technical interpretations of gender as women and of women and men as isolated categories, thus shifting away from the rather "impersonal, apolitical, and universal imaginary of climate change (impacts and interventions), projected and endorsed by science" (Jasanoff, 2010: 235).

FPE recognizes the close interlinkages of gender with other social categories and differences in gender–environment relations, and points out that resource-related relationships relate to "women's particular circumstances" (Molyneux, 2007: 231), which also vary in different social, political and economic settings (Rocheleau et al., 1996). FPE recognizes the importance of examining people's embodied experiences of resource degradation, disasters, mobility and displacement as these connect with other scales of power and decision making (Hanson, 2016; Harding, 2008). Thus FPE brings in the importance of the intersectional approach and analysis of gender–environment relations, which considers the dynamic combination of gender with social factors (Elmhirst, 2011).

The PAR model was developed from a political ecology perspective with the intent to bridge the divide between social and biophysical understandings of vulnerability (Adger, 2006; Blaikie et al., 1994). It not only shows the physical hazards but also identifies economic, demographic and political processes as the most important root causes in the progression towards vulnerability, because these reflect the functioning of the state and the distribution of power, and therefore "affect the allocation and distribution of resources, among different people" (Wisner et al., 2003: 52). The PAR model gives the progression of vulnerability "from root causes through local geography and social differentiation" (Adger, 2006: 272).

This paper conceptualizes vulnerability not just as a characteristic of some groups, but rather as a condition produced and driven by a wide variety of conditions. Vulnerability is embedded in everyday power relations and the political economy, and is inflected by social capital (Pelling and High, 2005; Turner, 2013), gender (Morchain et al., 2015; Sultana, 2014) and ethnicity (Bolin, 2007) among other factors. Vulnerable groups are not only at risk because they are exposed to a hazard, but also as a result of marginality, of everyday patterns of social interaction and organization and of access to resources. In this sense, vulnerability describes a set of conditions of people that derives from the historical and prevailing cultural, social, environmental, political and economic contexts. Thus the major contextual conditions that influence vulnerability of an individual or group in the HKH are social and gender structure, geographical location, economic setting and political environment.

These contextual conditions interact with each other and with other external drivers such as market forces, urbanization, consumerism, infrastructure development and technological interventions, and produce differential types and degrees of vulnerability. Thus the framework brings in the changing contexts as drivers of change, which have been often ignored in studies on gender and social vulnerability that mostly focus on assets and resources (Vincent, 2004).

To understand gendered vulnerabilities, the framework brings in two domains: contextual conditions and drivers of change. Within each of these are various components that intersect and interplay with each other. The interplay of various contextual conditions and drivers of change shapes the vulnerabilities of individuals and groups of women and men. Thus, the framework captures the multiple and multi-layered "determinants that shape differentiated context specific vulnerabilities" of individuals and groups (Ravera et al., 2016: 335).

3.1. Contextual conditions

The contextual conditions are akin to the root causes as given in the PAR model, and are understood within this paper as the

various broader conditions and contexts that are present, and which are often a result of historical structures and processes. The contextual conditions identified are social and gender structure, geographic location, economic setting and political environment. The fundamental point of this framework is the approach that gender is not only a powerful and pervasive contextual condition, but that gender intersects with other contextual conditions to shape vulnerabilities.

3.1.1. Social structure

Social structure is made up of social relations that are determined by multiple and layered factors and elements such as cultural norms and patterns, religious beliefs, institutional composition and systems, social interaction, marginality, gendered division of labor, gendered mobility and access to and control over resources (Eakin et al., 2014; Ferriss, 2006; Liverman, 2015; MacGregor, 2010; Tschakart, 2012). Furthermore, social structure is dynamic, and is produced and reproduced throughout history; it is thus a "richly textured n-dimensional space in which [individuals and] organisations navigate" (Lounsbury and Ventresca, 2002: 3). As aptly put by MacGregor (2010: 149):

> Structural conditions and drivers are the mechanisms by which fragmented and complex subjects [people/groups/communities] are formed, and how they are perpetuated through various layers of inequality and oppression, and how they act in the context of contextualized power.

Many different social organizers create social differences, including caste, class, ethnicity, age, wealth and religion. In the HKH the social structure plays out in numerous ways and processes, such as class, caste, ethnicity, race, religion, age, health, disability and language. There are also other, more nuanced and fluid features, such as marital status, number of children, number of sons versus daughters, profession and education.

Class is a form of social stratification, wherein people are categorized based upon social, economic and political status. A principal component of class is its fluidity and social mobility, as the individual has the ability to move both upwards and downwards within the hierarchy (Acker, 2006; Anthias and Yuval-Davis, 1983). Thus, there is "a sustained and hidden logic to the structuring and restructuring of class relations over time" (Duncan, 2009: 181). In the HKH class is also defined by the ethnicity of individuals; certain ethic groups, particularly the indigenous groups and tribes who have been in the periphery of political power, are often looked upon and treated as "lower" class. People belonging to the lower class have by definition less power and fewer resources, making them more vulnerable than those belonging to the upper class.

Caste is associated with Hinduism and is a "hereditary and hierarchic system" (IDSN, 2009: 2) in which social position is ascribed at birth. Families are assigned into one of four caste groups, known as *varna* in the hierarchy (Subedi, 2010). Although the caste system was created to fulfil all social needs through the ascription of position and the occupations associated with these positions, the system has resulted in pervasive inequalities and discrimination (Cameron, 1998; IDSN, 2009; Kumar, 2014). While there are differences between HKH countries in terms of the experiences of the various caste groups owing to different political, historical and religious backgrounds, caste-based discrimination, exclusion and marginalization is quite prevalent (Bennett, 2005; Bennett et al., 2008; Rao, 2010). Such discrimination and exclusions render some groups of people more vulnerable than others.

Ethnicity is a social classification that groups diverse groups of people by specific cultural characteristics and features (Anthias and Yuval-Davis, 1983). A key category is that of ancestry but sometimes aspects such as faith, tradition and values are also taken as the basis (Skop and Li, 2005). The HKH region is inhabited by numerous ethnic communities with their own cultures, practices and social structures. Often these communities comprise indigenous and minority groups, who have:

> less influence over local, national and international decision making, face political marginalization, are dependent on resources that are directly affected by climate change, and often inhabit economically and politically marginal areas in diverse, but fragile ecosystems
>
> (Salick and Byg, 2007: 4)

Thus, class, caste and ethnicity-based socio-cultural institutions are key to the production of social differences in the HKH. Adding to these differences are religion, age, health, education, disability, language and the other nuanced and fluid features of identities. These social stratifiers lead to differential vulnerabilities, as they create differences in hierarchy and power status. A combination of the layered differentials and stratifiers results in marginalization and exclusion of certain individuals and groups, leaving them with limited access to resources and skills crucial for adaptation to – and recovery from – climate-related hazards.

3.1.2. Gender structure

Gender is composed of the socially constructed meanings, behaviors, characteristics and differences attributed to being male or female, and is an integral part of social structures. Gendered constructions, roles and responsibilities are shaped by the culture and knowledge systems that underpin societies, and by what is deemed to be appropriate or inappropriate to being a female or a male. This means that understandings of gender and what it means to be either male or female are highly diverse and related to context. As a result, gendered constructions are contested and (re)negotiated over time, even in the same community (Lazar, 2005; Nelson and Stathers, 2009; Sultana, 2009). In the HKH, there is a high level of diversity in terms of cultures, religions, beliefs, norms and practices within and between the countries, but a patriarchal social structure is the over-arching common characteristic that defines the majority of gender relations in the region (Gurung, 1999). In general, the gender division of labor in the HKH is highly skewed, with women shouldering huge amounts of work within the household and the community, as well as in agriculture and other casual labor. However, women continue to be "constrained by unequal power relations, gender biased attitudes and norms" and often by

"systematic exclusion and under-representation", resulting in limited access to resources, ownership and control over critical natural resources (Goodrich et al., 2017: 12). The paper from Bangladesh in this issue highlights how norms and values associated with marriage practices in Bangladesh is a barrier to implement affirmative policy to women's empowerment. This would result in women's increased vulnerability to climate change, climate variability and climate-induced disasters. Their work load would increase, access to basic services and development services would be limited and they would also face the risk of gender-based violence, sexual harassment/assault and trafficking. Thus gender inequalities play a critical role in shaping differential vulnerabilities for women and men in relation to climate change-associated risks (Ravon, 2014).

3.1.3. Geographic location

Some regions and areas, particularly coastal zones and mountain regions, are more exposed to hazardous events (IPCC et al., 2012). Thus, people and communities can have, or be at risk of, higher levels of vulnerability as a result of where they are located (Dilley et al., 2005). Mountain regions are particularly exposed to climate change and more likely to be among the most vulnerable owing to the sensitivity of snow cover and its fast reaction to temperature changes (McDowell et al., 2013). People living in high mountains and close to glaciers are threatened by possible glacial lake floods outburst (GLOF) The increasing snowmelt can raise water flows in the river downstream, making the lives of people close to rivers more vulnerable. The floodplains of the HKH face another set of climate-related hazards, such as floods and cyclones on the one hand and droughts on the other hand. These same areas will also be exposed to sea-level rise, leading to increased risks of flooding and salinization of water and agricultural land (Memon, 2012). Since the socio-economically challenged population lives in geographically vulnerable areas, the impact of climate change will make these people more vulnerable.

Yet another dimension of geographical location is the division into rural and urban. Rural areas can be vulnerable owing to their relative remoteness, resulting in poor access to public services including transportation, education and healthcare facilities (Kapoor and Ojha, 2006; Thieme and Müller-Böker, 2004), which can reduce people's capacities to adapt and recover. In the HKH the rural areas are often located in remote mountains, and on steep slopes, making the vulnerability of the people living there even more acute. Urban areas also have their own set of vulnerabilities, such water shortage, and poor-quality water, sanitation and drainage. The urban centers are vulnerable to flooding:

> from the sea (higher sea levels and storm surges); from rainfall – for instance by heavier rainfall or rainfall that is more prolonged than in the past; and from changes that increase river flows – for instance through increased glacial melt
>
> Satterthwaite (2007): 5

All countries in the HKH fall under low- and middle-income groups, where most often the quality of housing and infrastructure in the urban centers is mostly not of the best; nor is urban planning and land-use management well developed. As a result, vulnerabilities increase for urban residents in the form of poor-quality water and sanitation, water shortages, damage to houses and property, drainage problems and spread of disease (Haque et al., 2013; Howard et al., 2016).

Owing to its geographic location and topography, the HKH faces specific vulnerabilities related to climate, resulting in substantial destruction of land and property along with loss of lives and livelihoods, leading to aggravation of the problems of poverty, food insecurity, hazards and social inequity.

3.1.4. Economic setting

The vulnerability of populations to climate change is closely related to economic poverty (IPCC et al., 2012; Leichenko et al., 2014). Economic conditions are understood not only as tangible economic capital, but also as the ability to access economic institutions for financial assistance. As a result, while individuals and households within a geographical locality can be exposed to the same degree of risk, the poorest are most likely to be vulnerable as a result of their exposure (Demetriades and Esplen, 2008). This is because: (1) they tend to be less able to invest, either through personal assets or loans, in measures to help cope with, and recover from, climate-related hazards; (2) those with fewer financial resources have less access to knowledge, information and services on climatic risks and hazards, and on adaptation measures; and (3) rural poor depend more on natural resources directly impacted by climate change for their livelihoods, such as agriculture, fishing and pastoralism in urban areas the poor are more involved in low-income, informal labor that offers no protection when there is disruption to such work from climate events ((Leichenko et al., 2014; UNFPA, 2009). The HKH is one of the world's poorest regions (Zomer et al., 2009), so economic conditions play a major role in shaping the degree and type of vulnerability of its people.

3.1.5. Political environment

Political powers, whether at the international, regional, national, community or household level, have a key role in vulnerability to climate change. Those holding political power are able to make decisions on mitigation and adaptation, as well as on social choices that in turn influence vulnerability and the recognition of current experiences of vulnerability. Thus, the political environment and degree of meaningful representation in decision making underlie manifestations of vulnerability to climate change, as they determine the extent to which the various experiences and needs of different groups on climate change are incorporated into decision making. However, participation in decision making is often captured by elite groups within societies, leading to the exclusion and under-representation of marginalized and minority groups such as women, lower castes, ethnic minorities, the poor, the less educated and the disabled (Agarwal, 2001; Pelling, 1999; Ribot, 2010). In this way a category of people with no political leverage or representation in the policy and institutional decisions that affect their lives are the ones who are more vulnerable to climate-induced risks and

hazards. The mountain people are politically under-represented in national, regional and often global decision making, even in those decisions pertaining to resources from the mountains and which could have everyday implications on their lives and livelihoods. Often, such decisions are made in far-off capital cities in the lowlands where most centers of political power are located.

3.2. Drivers of change

Drivers of change are those forces that are externally driven and have been emerging over time, which have deep implications for the vulnerabilities of individuals and groups. Some major drivers of change in the HKH are globalization, market forces, urbanization, consumerism, infrastructure development and technological interventions. These drivers of change are accelerating at an alarming pace, "opening up the mountain communities to a wider world of institutional arrangements, relationships and opportunities" (Goodrich et al., 2017: 12). Globalization and regionalization trends and processes with economic liberalization are connecting markets, infrastructural development, industrialization and urbanization, creating an increasingly built-up environment (Goodrich et al., 2017: 2–3) and fuelling consumerism, aspirations and migration. Technological interventions have given the power of information, (among others) to many people, but at the same time have marginalized those who lack access to these resources. These changes have a major role in determining the degree and type of vulnerabilities of individuals and groups.

3.3. Intersectionality and gendered vulnerability in the HKH

In this paper we conceptualize intersectionality as the various contextual conditions and drivers of change "interacting with and co-constituting one another to create unique [vulnerabilities] that vary according to time and place" (Hankivsky, 2014: 9). People in mountain areas of HKH experience over-arching political, economic and social marginalization vis-à-vis lowland people (Gurung, 1999). Living in marginal and fragile environments means limited access to material, social, economic and political resources, leading to limited skills, technologies and income-earning possibilities (Pasteur, 2011). There is then the further intersecting of the various contextual conditions within the HKH that go on to create multiple identities of both women and men. The interplay of the multiple identities, such as caste, class, ethnicity, gender, age, education and health, shape differentiated vulnerabilities (Below et al., 2012; Huynh, Resurreccion, 2014; Nightingale, 2011; Onta, Resurreccion, 2011; Ray-Bennett, 2009). A critical aspect of the contextual conditions is the dynamic nature of each of the conditions, reflecting the changing times and discoveries that are internalized and legitimized within the contextual conditions to recreate new realities within which individuals operate and navigate. Thus, in the intersectionality and interplay of contextual conditions that create multiple layers of identities, specific location and time is critical.

The contextual conditions further interplay with the external (and often new) drivers of change, shaping and re-shaping people's vulnerabilities. The drivers of change outlined above have led to transformations in people's aspirations, attitudes and values. These have resulted in comprehensive changes in (choices of) livelihood patterns and systems, as well as utilization and acquisition of resources, which in turn are creating new or intensifying the ongoing dynamics of vulnerabilities. The phenomena of globalization, urbanization and technological interventions are increasing the trend of outmigration of young men from the mountains, leading to increased workloads and responsibilities for women. These, in turn, result in higher drop-out rates of girls from formal education, increased gender-based violence and trafficking of women and girls. Similarly, because of fast-paced urbanization, infrastructure development and technological interventions, the poorest people are pushed to reside in at-risk locations, such as on steep slopes or floodplains that are often deemed unsuitable for residence. The paper on Gandaki in this special issue highlights increased vulnerabilities of women and children who are left behind due to long-term migration of men.

In addition, infrastructure development like roads have connected remote mountain villages to cities, bringing in urban goods such as processed food, which is found to be replacing the traditional consumption of high-value nutritious mountain grains like barley, buckwheat and millet (Hi-AWARE, 2017). As a result, there is a growing trend of low nutrition intake among mountain people, making them more vulnerable when coping with life's hardships. Similarly, changes in technology and markets have played their part. For instance, the trend of promoting cheese production in high mountain areas has resulted in minimal consumption of milk by families, so they can earn money. This change is perceived by community members as a reason for the growing problem of knee pain among older populations (Hi-AWARE, 2017). The trend towards globalization, and increased involvement in economic activities, is found to be eroding the age-old practice of collective action in high mountain regions, increasing people's vulnerability.

4. Gendered vulnerabilities

Vulnerabilities are not gender neutral. They are gendered and manifest themselves in differential ways to different groups/categories of women and men. Gender plays a key role in determining the degree of vulnerability of an individual but, more importantly, it is the combination of gender with other axes of social differentiations that shapes vulnerabilities. Therefore, stereotypes around the relationships between gender as a homogeneous group and the environment conceal inequalities and overlook complex environmental and gender dynamics (Chant, 2008). The framework brings out the multiple conditions present in the societies, and the external factors of change, which intersect and interplay in a specific location and time as key elements shaping gendered vulnerabilities of different individuals and groups to climate change and climate variability. The interplay and intersection of multiple conditions and drivers of change alter or influence the livelihood options of women and men, determining their capability to respond to risk posed by climatic and socioeconomic stressors. Vulnerability is, therefore, a dynamic condition produced by existing inequities in distribution and access to resources, and an individual's choices and opportunities; these ultimately also shape women's agency that has implications for their vulnerabilities and capacity and vice versa (Kabeer, 2005; Thenjiwe et al., 2014). These are

shaped not only by the history of social domination and marginalization, as suggested by Eakin and Luers (2006), but also by the ongoing factors of change, location and time. Thus, vulnerability is not only experienced, but rather embodied, based upon personal circumstances (Liverman, 2015). Simplifying "gender" to binaries of women and men – or even considering its intersectionality only with social structures of class, caste, ethnicity and age – will lead us to miss the multidimensional impacts and implications of climate change and climate variability on different groups of people. The feminist intersectional approach in the framework takes a two-layered interdisciplinary research approach which integrates *contextual conditions* (social, geographic, economic and political contexts) with emerging *drivers of change*. The conceptual framework broadens the PAR model by considering SRA and FPE approaches.

By representing complex contextual realities in the face of external drivers of change, this intersectional approach can help in improving our understanding of how gender intersects with other social fault lines such as ethnicity, caste, age, wealth, class and capabilities, and also interplays with external factors of change to ultimately shape vulnerabilities. The framework can be useful in visualizing how contextual conditions are changing and being renegotiated under new drivers of change. It can help us to understand how interactions among multiple social dimensions of power and change not only shape gendered vulnerabilities, but also capacities. This, in turn, will contribute to the planning and development of adaptation policies and strategies to deal with the impact of climate change (Ravera et al., 2016). This framework has been used in the empirical papers that follow this paper in this issue. Based on the context of the study area, each paper looked at the predominant intersectional issues shaping gender vulnerabilities in the area given.

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