

**Gender and climate change in the Indian Hindu-Kush Himalayas**

M. V. Ogra and R. Badola

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# Gender and climate change in the Indian Hindu-Kush Himalayas: global threats, local vulnerabilities

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## Abstract

Global climate change has numerous implications for members of mountain communities who feel the impacts in both physical and social dimensions. In the Western Himalayas of India, a majority of residents maintain a livelihood strategy that includes a combination of subsistence or small-scale agriculture, seasonal pastoral migration, male out-migration, and localized natural resource extraction. Particularly under conditions of heavy male outmigration, but throughout the region, mountain women play a key role in providing labor and knowledge related to the management of local natural resources, yet often lack authority in related political and economic decision-making processes. This gap has important implications for addressing the impacts of climate change: while warming temperatures, irregular patterns of precipitation and snowmelt, and changing biological systems present challenges to the viability of these traditional livelihood portfolios throughout the region, mountain women increasingly face new challenges in their roles as household managers that have not adequately been emphasized in larger scale planning for climate change adaptation and mitigation. These challenges are complex in nature, and are shaped not only by gender issues but also interacting factors such as class, caste, ethnicity, and age (among others). In this paper, we review the main arguments behind the discursive gender/climate change nexus, discuss the implications for gendered vulnerabilities and transformation of adaptive capacities in the region, and suggest ways that researchers and policymakers seeking to promote “climate justice” can benefit from the incorporation of gender-based perspectives and frameworks.

### 1 Introduction: why *Gender* and climate change?

“It is increasingly evident that women are at the center of the climate change challenge. Women are disproportionately affected by climate change

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climate change is neither “gender-neutral” nor just a technical problem. Rather, these scholars and observers argue, it is a problem for which technical solutions address only proximate causes and not root ones. As Stenhammer and Kelkar (2014) suggest in writing on behalf of UN-Women, increasing everyone’s (but especially women’s) access to technological interventions and markets is important, but will not alone be sufficient to address underlying causes of gendered vulnerabilities and related inequities. Even the IPCC and UNFCCC secretariat recognize the importance of integrating a gender perspective into climate change planning and research, noting for example, “If climate change increases water scarcity, women are likely to bear the labor and nutritional impacts” (IPCC-WG2, 2014) and suggesting that women’s empowerment “will be a significant factor in meeting the climate challenge and achieving the long-term objectives of the Convention” (UN, 2014b).

At the same time, the ability to successfully mitigate the impact of anticipated events or adapt to change over the long term depends on a secure and sustainable livelihood base – as well as on the social standing, economic security, and political voice required to maintain it. While securing and maintaining social standing, economic security, and political voice represent key challenges to overcoming discriminatory effects for *all* vulnerable groups, However, feminist studies of the gender/climate change discourse are somewhat discouraging (e.g., Sultana, 2013; Arora-Jonsson, 2011; MacGregor, 2010; Denton, 2004), in that they suggest that (poor) women are, once again, at the risk of being cast somewhat monolithically or simultaneously as “the problem” (as fuelwood collectors and imprudent resource managers), “the victim” (of climate change), or the “solution” (through their skills, activism, or presumed close relationship to nature). Worse, as MacGregor (2010) argues, predicating actions on the assumption and expectation that as a group, “poor women” are going to shoulder the burden not only perpetuates unhelpful essentialisms about a homogenous category of “Third World woman” (Mohanty, 1988), but also serves to *naturalize* rather than *problematize* the underlying reasons for differential impacts. In doing so, climate actions that focus too narrowly on the immediate needs of “vulnerable women” run the risk of missing this



critical opportunity to prioritize, galvanize support around, and ultimately address the long-term and “sticky” issues noted in the World Bank’s (2012) report.

Finally, formal calls by delegates to increase the representation and participation of women in UNFCCC delegations and decision-making bodies at the national level have been met with only modest gains. Relatively early in the process, Denton (2002) suggested that climate change negotiation represented by the UNFCCC process was itself a parody of an unequal world power economy, where wealthy nations dominated the discourse and framed it in terms of issues of “poor” and “developing” country adaptation/mitigation – rather than about overconsumption in the global North. Those who set the agenda, she suggests, have both the privilege of prioritizing certain issues as well as of excluding others. This privilege, we would add, extends to issue problematization and framing. Through what processes, and under what rationales, are “gender issues” integrated into not only policy frameworks but also into decision-making structures? Who controls the climate change discourse? Although a few women currently hold prominent leadership positions within the secretariat-constituted bodies of the UNFCCC and Kyoto Protocol (i.e., the Secretary-General of UNFCCC and heads/co-chairs of the Compliance Committee facilitative branch, the Least Developed Countries Expert Group, the Adaptation Committee, and the Standing Committee on Finance), a recent report also indicates there is still a relatively low percentage of women represented in country delegations: at the COP-18 in Warsaw, for example, women comprised just 29.4% of the 5090 total country delegates (UN, 2013, p. 7). The report notes:

The gender composition of the constituted bodies varies: while women’s representation is as high as 52% in the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention (a constituted body of 24 members mainly from Africa, Asia and the Pacific, and Latin America and the Caribbean), *there is a clear gender imbalance in all of the other constituted bodies, with women’s representation as low as 11–13 per cent in some cases* (UN, 2013, p. 4).

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While increasing the participation of women into decision-making structures is often sought by institutions as a primary means for bringing gender issues to the fore in policy discussions, experience has shown that token participation is insufficient to bring about real change (Guijt and Shah, 1998) and the incorporation of women into pre-existing power hierarchies tends not to lead to structural change (on this point, see 2012 *Gender and Development* special issue on “gender mainstreaming”). Hemmanti and Rohr explain that in the context of climate change, the call for “gender justice” references an approach “that goes *beyond* seeking an equitable share in the existing power system, which has been causing the current problems” and seeks to raise the questions, “What is just?” and “What kind of justice do we want?” (2009, 30–31). In considering the concern that the negative impacts of climate change will be disproportionately borne by the most vulnerable and/or least capable of adaptation, we would add to this list of questions: “Justice for whom?”

### 3 Locally reported climate-change impacts in the Indian HKH

Models seeking to understand the long-term effects of climate change in the HKH are discussed elsewhere in this issue, and suggest the depths, limits, and shifting terrain of our understanding of what lies ahead in terms of physical change. As we discuss further in the next section, the meaning of these changes from a social perspective will vary geographically and between groups of people, depending largely on the range of assets and capabilities available for coping and adaptation. However, to first give context and a sense for the range of interconnected impacts of climate change already being perceived and reported by local residents, in this section we present a range of perceived impacts directly reported by HKH residents. Following Sweetman’s (2009) call for research that seeks to further understand the meaning of climate change in people’s daily lives from a gender perspective, we provide a simplified model below (Table 1) that summarizes results of some recent fieldwork in the region. Drawing from communities in the Western Himalaya of India (mainly Himachal Pradesh and

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Uttarakhand), the selected examples provided under the categories “direct impacts”, “indirect impacts”, and “gendered effects” help to illustrate that although women and men report a shared experience of environmental change in many respects, an additional layer of gender-differentiated outcome can be clearly discerned (particularly due to the gendered nature of *indirect* impacts). This insight holds throughout the region, comparable with patterns reported in Nepal in policy discussion documents prepared for WEDO (Leduc et al., 2009) and ICIMOD (Leduc, 2009).

We must also note that it is by now well established that poor and marginalized populations disproportionately experience the negative impacts of climate change (Mearns and Norton, 2010). Thus, although we have not further disaggregated impacts along lines of caste/class in the table, we assume that families characterized by persistent economic discrimination (e.g., *Dalit* communities) and single-headed households (e.g., female-headed households associated with distress migration of male members or widow status) would likely possess even fewer coping resources than their relatively socio-economically or politically privileged counterparts. Similarly, as gender inequalities discussed in the previous section generally lead to a “more severe experience” of poverty among women relative to men overall, female members of “non-poor” households may well be similarly disenfranchised through unequal distribution of household resources such as power, food, and property (Demetriades and Esplen, 2010).

#### 4 Sustainable livelihoods and adaptive capacity

In this section, we present ways in which the Sustainable Livelihood (SL) framework (DFID, 1999) offers a robust base around which to further a discussion of differentiated vulnerabilities, adaptation and adaptive capacity, and mitigation of the livelihood-related impact of climate change. We illustrate the discussion using examples from our fieldwork and experiences in the Western Himalaya, specifically from the Nanda Devi Biosphere Reserve (Uttarakhand state, India). As shown in Fig. 1a and discussed further below, application of the SL framework enables an examination of how different





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protection through a zonation approach. As a region, the NDBR is comprised of three main zones: buffer, transition, and two core areas: the Nanda Devi National Park and Valley of Flowers National Park. There are 47 villages in the buffer and 33 villages in the transition zone. *Bhotia* and *Garhwalis* are the main ethnic groups of the area. Historically, local livelihoods for both communities have been based on trade and marginal agro-pastoralism. As in many Himalayan communities where women’s labor is critical to household viability, women have traditionally held a high status in both groups. However, daily responsibilities and expectations in NDBR generally follow gender-based divisions found throughout the region; in both ethnic groups, traditional practices tend to assign control of money and capital to adult men, while their female counterparts have greater control over household resource allocation in day-to-day living (Badola et al., 2013).

In response to the growing demand for nature based tourism in the area and with an aim to develop stakes of local people in biodiversity conservation, ecotourism is currently being promoted by residents of several villages. Tourism is pertinent to the region because of the peculiar opportunities and challenges of the context. Key opportunities include, for example, sensitive ecosystems that require protection, communities that require alternative livelihoods to reduce dependencies on natural resources, and a landscape that has been traditionally attractive to tourists for religious and recreational purposes. Tourism can also present solutions to livelihood-based challenges in the region by offering alternative development trajectories leading to strengthening of assets. This is particularly relevant because the state-led development in the region has focused on transportation and hydropower infrastructure projects and failed to promote sustainable local livelihoods, while simultaneously creating additional threats to biodiversity and natural resources.

As a part of ecotourism, the facility of “homestays” is being promoted in the peripheral villages of the NDNP which provides monetary benefits to the communities. On the surface, it would seem that the benefits of this arrangement accrue inequitably: male members of the local communities are mainly involved in the monetized tourism-related

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activities in the area such as serving as trek guides, porters, cooks, and fee collectors, while women are typically only involved in unpaid, low-status domestic tasks such as preparing food and fetching additional firewood and other biomass resources. However, in the face of increasing pressures for men to out-migrate and in the context of increasing vulnerability of traditional agriculturally-based livelihoods to climate change, ecotourism has the potential to become an important part of a larger adaptation strategy that strengthens adaptive capacity for both women and men in the mountain regions. Below, we briefly examines the ways in which ecotourism appears to be changing the assets of hill women and men in different ways. Though we have intentionally limited the discussion to women for purposes of this discussion at the risk of (mis)representing them as a homogeneous group, intersecting vulnerabilities associated with economic status or age (for example) would certainly need to be included in a more comprehensive analysis.

The narrative below is based largely on qualitative ethnographic fieldwork (e.g., open-ended and semi-structured interviews, group discussions, and personal observations) achieved through repeated co-author visits to the site since 1995, and incorporate related findings from a recent interdisciplinary study of 22 NDBR villages (conducted over the past five years by a team of researchers affiliated with the Wildlife Institute of India; see Badola et al., 2014, 2013).

### 4.2 Ecotourism and gendered livelihoods at NDBR

For communities experimenting with ecotourism in the area, some improvement of livelihood assets for women has been observed. In the households that have homestay facilities, for example, the women had more opportunity to interact with the tourists due to their role in activities like cooking and cleaning. This resulted in their being more aware of conservation and development issues as well as a development of their own personal self, such as regarding personal hygiene, appearance and knowledge of their surrounding areas. Participation in ecodevelopment committees (new local institutions created to support ecotourism in the context of larger community-based development



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goals) provided a platform for women to develop participation capacities and leadership skills within formal institutional settings. Informally, women also cooperated more with each other and earned respect through recognition of their role in an activity which brought in direct cash income for the family. Moreover, these arrangements may result in emergence of new institutions or changes in existing ones, wherein the women may have a greater voice in decision making regarding their economic activities as well as the natural resource base, rather than remaining silent spectators, or limiting their participation to simply adding their names to member attendance rosters.

We also informally observed that in families which were getting regular tourists for their homestays, there was less male migration. In addition, villagers reported that a diversified income base led to less reliance on natural resource extraction, due to practical reason of the extractors being “gainfully” employed. In the earlier tourism models in this area, the males were largely employed as porters and guides to accompany trekking parties leading to their absence for long periods of time. This resulted in additional burden of domestic and agricultural work on the women, without recognition of their extra efforts. It led to employment for only a small number of people, mostly men who were directly employed in such activities. However the involvement of women in ecotourism activities had broadened the spectrum of beneficiaries as also the skill base of the people engaged in such activities. In social terms, it is a more inclusive model where both the women and men work together. Although the tasks are still more or less well-defined and linked to gender, the overall approach is more complementary (as compared to the earlier version where both worked on different activities and there was little overlap between their works). In other words, women and men are both positioned to be valued contributors to a larger, cooperatively-based “productive” economic/domestic system. Figure 2 conceptually illustrates the ecotourism experiences of women in the NDBR study villages from the SL perspective, with a focus on gender-differentiated assets development.

## 5 Future directions?

This paper has been devoted to a discussion of the gender/climate change nexus, with a particular focus on women's differentiated vulnerabilities in the Western Himalaya. We have offered details from regional ecotourism experiences to suggest ways that livelihood assets can be strengthened, as part of a larger climate adaptation approach that employs a differentiated framework as its basis. As suggested by Fig. 2, ecotourism can contribute to the promotion of non-consumptive use of mountain resources and can be an important tool for providing well-defined livelihood enhancement opportunities, but this is just one example of an alternative livelihood strategy. Indeed, ecotourism interventions in other areas have led to weakening of assets (Coria and Calfucura, 2012). We do not wish to suggest that any one adaptation strategy will be a panacea.

Climate change obviously poses myriad challenges, which we believe will increasingly demand a team-based research approach that brings together climate scientists, policy scientists and practitioners, and social scientists. The range of observed physical changes already demand, as well, that as researchers we work collaboratively to conceptualize the problem at all scales – global/regional/local as well as intra-community/inter-community. It is perhaps from this latter perspective that differentiated impacts, as seen through a lens of gender (or other stratifying categories), can best help to inform the applied research agenda for climate scientists and adaptation/mitigation policymakers, and vice-versa. Our examples illustrate that because women are clearly experiencing a gender-differentiated burden of climate change impacts, adaptation strategies will need to revolve around and respond directly to them (Fig. 3).

However, as demonstrated through the examples provided in Fig. 3, such changes cannot occur without enabling changes in the surrounding institutional, economic, and cultural landscape. This has implications for the research and policymaking landscapes, as well as for the communities we aim to support through our endeavors.

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## Suggestions for further research and concluding thoughts

In 2009, Hemmanti and Rohr argued that the conceptual notion of climate justice represented an effective entry point for larger reflection about the meaning of gender equality in the context of climate change impact mitigation as well as a concept that carries powerful implications for future climate negotiations regimes. They observed that gender equality is “finally beginning to be accepted as one of the core principles of mitigating climate change and adapting to its impacts” (2009, p. 25). Five years later, we close this article with a few examples of possible questions for HKH climate scientists that can reflect an interdisciplinary commitment to gender justice through new lines of research: how can models of changing monsoon patterns be improved to reflect possible implications for the food crops preferred by women cultivators, in comparison to cash crops promoted by state-based or corporate/multinational agricultural extension agents? Knowing that certain groups of individuals in the HKH (women farmers, elderly residents, and male trekking guides, for example) possess tremendous knowledge about agro-ecological, glacial extent, and forest-based biodiversity changes, how can models of environmental change more directly take into account gendered and local systems of knowledge production? Land use?

Existing lines of climate change and livelihood research can also be reframed and enhanced by taking a team-based approach that reflects a commitment to gender justice/climate justice: in what ways can predictive models better reflect the hazards associated with “small-scale” disasters for different groups, or provide finer-scale data about shifting monsoons, wind patterns and land cover changes that have gendered impacts, as suggested by IPCC-WG2 (2014)? Can spatial models of flood hazard and disaster preparedness action centers incorporate practices from participatory GIS to reflect the location of activist networks, as contributions by Leduc (2009) and Gaillard et al. (2012) motivate us to ask? For policymakers and social systems modelers: how does climate-related information flow throughout a community? Bearing in mind that land tenure and land rights are highly gendered and class-/caste- differentiated in the HKH, under what

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5 tenurial and natural resource management regimes are national and regional carbon sequestration goals best achieved? How are decisions taken regarding best practices for community- or household-level adaptive response to a changing climate? What will it take for economic growth or income-based models, disaster response plans, alternative livelihood strategy designs, integrated conservation-development initiatives, and other critical resources for sustainable development planning to be routinely implemented with reliable, sex-disaggregated datasets that not only include the formal sector but also take into account the vast informal sector that otherwise overlooks the tremendous economic contributions of women? What information do people *need*, in 10 order to more effectively plan and make choices about adaptive response?

There is clearly still a need for research on the specific outcomes that climate change is likely to bring to the HKH, and we hope that this discussion stimulates readers to ask themselves how their own inquiries and methodological approaches can add to this short list. Moreover, we would urge that analytical models seek to employ frameworks that include differentiated vulnerabilities, wherever possible – and in particular, to analyze gender-differentiated vulnerabilities. It is with this foundation that we will be able 15 to move more effectively toward adaptation/mitigation strategies that build, rather than weaken the livelihood assets for women – and in so doing, heed the UNFCCC’s calls to conceptualize women’s empowerment as a “significant factor” in meeting the climate change challenges ahead. 20

Finally, although, the sex-disaggregated data we call for here will continue to be critical for informed policymaking about how best to adapt to climate change events and long-term scenarios in “gender-transformative” and “gender-just” ways, we must stress that this is likely only the beginning of achieving true gender justice in the pursuit of 25 sustainable and equitable development. This is not to diminish the value of the current trajectory within the gender/climate change arena, but simply to underscore the evolving complexity of the challenges that lie ahead. Eventually as researchers of environmental change, we will all need to move on to more sophisticated analyses of how gender functions as a social *structure* (i.e., not just treated as a “data” category)

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to shape vulnerability as well as to offer opportunities for strength and resilience; we also need to find a larger range of ways to analytically incorporate the intersectionality of gender with other socially stratifying and often discriminatory structures (such as race, class, caste, ethnicity, age, and so forth). These are critical methodological challenges which will require going well beyond sex roles and division of labor analysis. It is in this arena that feminist scholars can be of particular value as part of interdisciplinary climate change research collaborations. Indeed, some such scholars in the field of disaster risk reduction (DRR) have by now dispensed with the simple, binary conceptualizations of gender employed in this discussion, advancing our understanding of how for example, transgender (e.g., *hijra* communities in India, *meti* individuals in Nepal, *baklas* in the Philippines) and LGBTQI individuals in the United States experience differentiated vulnerability to the impacts of disasters such as floods, earthquakes, and discrimination in their efforts to seek recovery/relief (Balgos et al., 2012; Knight et al., 2012; Dominey-Howes et al., 2014). Similarly, emerging work about the way masculinity is experienced offers valuable insights about what different groups of men are experiencing in the face of climate change, particularly with regard to the migration experience and what women's empowerment means for (especially male) members of their families (Cornwall et al., 2011).

The pursuit of gender justice, as part of the larger climate justice agenda, offers an opportunity for climate change researchers and policymakers to contribute to the ensured viability of the mountain communities by (a) avoiding the trap of gender-blindness in research, policy, and intervention designs, and (b) seeking to develop and strengthen livelihood assets of vulnerable populations, while simultaneously working to promote the transformation of enabling structures. In the HKH, this means first recognizing the productive contributions and knowledge systems of mountain women, and prioritizing their assets development to help promote adaptive capacity at a range of scales. Research and policy collaboration with local institutions will also be important to expanding forms of social capital and networks of support, in the face of livelihood uncertainty and ecological change. For researchers, increased dissemination of climate-related

information and relevant research findings to all affected communities can be a related goal. Information supports choice, and choice is required for empowerment. By investing our time and inquiries to achieve both climate justice and gender justice, we can help to provide the support required for all HKH residents to envision and develop new sources of strength, themselves.

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**Table 1.** Reported examples of climate change indicators, impacts, and effects perceived by HKH residents\*.

Physical changes reported by residents	Direct impacts for residents	Indirect impacts for residents	Gendered effects (selected examples)
<ul style="list-style-type: none"> <li>– Higher summer temperatures</li> <li>– Erratic monsoon and more intense rains</li> <li>– Flash floods and landslides</li> <li>– Earlier frost dates</li> <li>– Rain instead of snow</li> <li>– Hail storms</li> </ul>	<ul style="list-style-type: none"> <li>– Crop loss/damage; lowered agricultural yields due to unexpected timing and intensities of heat, cold, and precipitation</li> <li>– Lowered milk production from cattle (stress on animals)</li> <li>– Hardship in labor/heat stress (more arduous conditions for field labor)</li> </ul>	<ul style="list-style-type: none"> <li>– Income loss due to widespread reliance on cash crop cultivation</li> <li>– Less food available for subsistence cultivators</li> <li>– Regional economy weakened</li> <li>– Food insecurity</li> <li>– HH indebtedness</li> <li>– Diminished health status</li> </ul>	<ul style="list-style-type: none"> <li>– Women prepare food but are last to eat; eats least of all due to scarcity and cultural norms that privilege calories for men</li> <li>– Male outmigration (stress and hardship for migrant and on family members left behind)</li> <li>– With male members gone, work overload on own farm for female HH head, as manager + family care-giver</li> <li>– Women may also now need to seek work as wage laborers</li> </ul>
<ul style="list-style-type: none"> <li>– Drying waterways and forest springs; reduced streamflow</li> <li>– Changes in vegetation and plant regeneration rates, including increase in invasive/weedy species</li> </ul>	<ul style="list-style-type: none"> <li>– Reduced clean water availability in surrounding forests</li> <li>– Reduced water availability for small-scale irrigation</li> <li>– Reduction in availability of medicinal herbs and other non-timber forest products (NTFPs)</li> <li>– Reduction in preferred fuel-wood/fodder species</li> </ul>	<ul style="list-style-type: none"> <li>– More time and energy is required to acquire natural resources required for domestic consumption and livelihood requirements</li> <li>– People have to travel farther away to find resources, as diminishing supplies are not being replenished at past rates</li> <li>– Increasing need to buy fuel from market</li> </ul>	<ul style="list-style-type: none"> <li>– While men are primarily responsible for earning wage-based income, the collection of natural resources (e.g. water, NTFP, fodder, and fuelwood) is primarily conducted by women and children</li> <li>– Increased labor demands for women</li> </ul>
<ul style="list-style-type: none"> <li>– Agroecosystem changes</li> </ul>	<ul style="list-style-type: none"> <li>– Increase in weedy plant species</li> <li>– New insect pests, including mosquitos and new agricultural crop pest species</li> <li>– Increased conflict with wildlife (attacks on humans and livestock; crop predation)</li> </ul>	<ul style="list-style-type: none"> <li>– Increased need for weeding</li> <li>– Increased need for pesticide application</li> <li>– Increased need to protect fields and home from wildlife</li> <li>– Declining crop yields (see above)</li> <li>– Increased mosquito bites</li> </ul>	<ul style="list-style-type: none"> <li>– While men are primarily responsible for earning wage-based income, women primarily responsible for weeding fields.</li> <li>– Increased temperatures in summer make this more arduous and increase risk of heat stress.</li> </ul>
<ul style="list-style-type: none"> <li>– Landslides and flash flooding associated with heavier and more intense monsoon rains (“natural disaster” events)</li> </ul>	<ul style="list-style-type: none"> <li>– Loss of life</li> <li>– Property and crop damage</li> <li>– Damage to road infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>– Loss of HH and family members/grief/trauma</li> <li>– Loss of HH labor sources</li> <li>– Loss of income in tourism-dependent areas</li> <li>– Post-disaster (distress) migration</li> </ul>	<ul style="list-style-type: none"> <li>– Women primarily responsible for care of others (especially elderly, children, and sick HH members)</li> <li>– Male distress migration leads to work overload for female HH head, as manager + family care-giver</li> <li>– Distress migration of whole family increases risk of sexual violence against and trafficking of women/children</li> </ul>

\* Sources: Kapoor (2011); Varsha (2012); Rana (2012); Badola et al. (2013), and additional field interviews led by Ogra in villages in Chamoli District, Uttarakhand in May 2014.



**Table 2.** Livelihood assets profile in Nanda Devi Biosphere Reserve study villages, with special reference to women's assets.

Human Capital	<ul style="list-style-type: none"> <li>– Sex ratio favors males, suggesting lower status of women/girls. Ultrasound technology since 2001 has coincided with a significant drop in the sex ratio for children.<sup>a</sup></li> <li>– Literacy rates favor males, suggesting lower status of women<sup>b</sup></li> </ul>
Natural Capital	<ul style="list-style-type: none"> <li>– Land tenure associated with men. Few women with land title.<sup>c</sup></li> <li>– Traditional crops dominated the agricultural land until 1975 but cultivation of cash crops currently dominate agricultural land.<sup>d</sup> This leads to narrowing of livelihood resource base as cash crops replace traditional crops. Related to food security and erosion/loss of traditional agricultural knowledge held by women</li> <li>– Presently only 42% people are cultivating some traditional varieties of crops. These did not bring in a lot of cash revenue for the household and as a result provided food security particularly for women and children.</li> <li>– Development activities and climate change resulting in shrinking forest and agricultural lands and changing cropping patterns means that women have to travel more for fuelwood and fodder. The households' dependence is now on food material procured from the market, often low quality food coming from the plain areas.</li> </ul>
Financial Capital	<ul style="list-style-type: none"> <li>– Cash flows controlled by men</li> <li>– Access to credit and collateral favors men. Although several schemes for women have been launched, most women are not aware of them.</li> </ul>
Physical Capital	<ul style="list-style-type: none"> <li>– Roads, built environment, technological interventions are directed to men's articulated priorities. Men are more likely to get employment in the development activities going on in the region. Roads etc. help men to commute and travel, and reflect their priorities for destinations.</li> <li>– Machines for de-husking were given to women but these were too heavy and are useless. (Women not involved in machine design)</li> </ul>
Social Capital	<ul style="list-style-type: none"> <li>– Institutional networks favor men and presume male heads of household (e.g., Panchayati Raj), despite quotas for women's participation. Even if women are members they do not speak up in such meetings due to their minority presence as well as social and cultural taboos. The place and time of meetings often does not suit women.</li> <li>– Women's organization not empowered to take any major decisions, their decisions are related to cleanliness drives or some other minor social activities. Where cash is involved, men take the decisions.</li> </ul>

<sup>a</sup> In 2001 all-India sex ratio ( $F/M$ ) for children = 927/1000 and for adults ( $F/M$ ) 933/1000. In 2001 Uttarakhand sex ratio ( $F/M$ ) for children = 908/1000 for adults 962/1000. (GOI 2002). In 2011, the all-India sex ratio ( $F/M$ ) = 919/1000 for children and 943/1000 for adult. In 2011, Uttarakhand sex ratio ( $F/M$ ) = 890/1000 for children; 963/1000 for adult (GOI 2011). In Chamoli district, our field data indicates a decrease in child sex ratio ( $F/M$ ) from 935/1000 in 2001 to 889/1000 in 2011.

<sup>b</sup> In 2011, the all-India literacy rate = 65.46% women and 82.14% men. In 2011, Uttarakhand literacy rate = 70.01% women and 87.4% men (GOI 2011). In Chamoli district, our field surveys suggest 2011 literacy rates of 72.32% women and 93.4% men.

<sup>c</sup> In 2011, female agricultural workforce was 70%, yet only 9.5% own land (FAO data cited in Kapoor, 2011).

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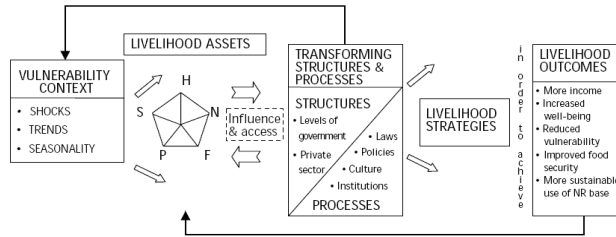
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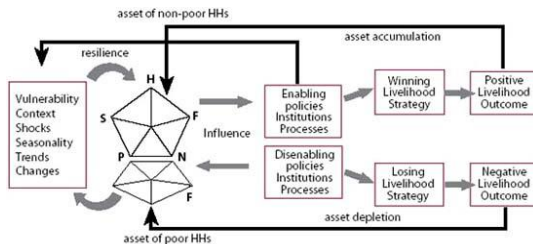
## Sustainable Livelihoods (SL) Framework

- a) **Basic Model**, where H= Human Capital, N=Natural Capital, F = Financial Capital, P= Physical Capital, S= Social Capital:



(DFID, 1999)

- b) **Illustration of assets balance for poor vs. non-poor households**, where assets above are shown with reference to Enabling/Disabling transformative structures and processes (policies, institutions, and processes)

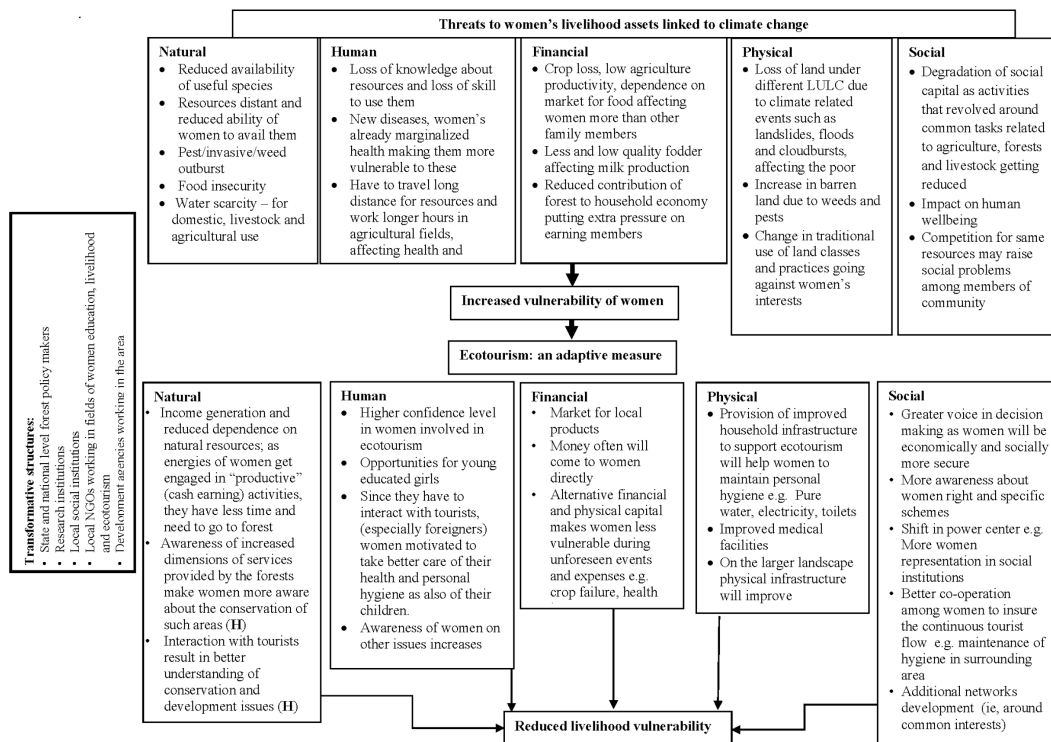


(FAO, 2005)

Figure 1. Sustainable livelihoods framework.

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**Figure 2.** Women's vulnerabilities to impacts of climate change: transformation of adaptive capacity through ecotourism as alternative livelihood strategy.

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### Climate Change Adaptation Practices – Gender Intervention Typology

Classification	Description	Examples of Practice
<i>Gender-Blind</i>	Interventions are literally ‘blind’ to gender difference and caste/class economic inequality; they <i>appear</i> neutral but are unintentionally male-biased	Resource management schemes for participation/benefit-sharing are targeted to registered heads of household (usually <i>de jure</i> male, even if <i>de facto</i> female). For example, promotion of pest-resistant cash crop seeds to replace local food/fodder crops.
<i>Gender-Neutral</i>	Interventions reinforce existing gender- and caste/class economic inequalities	Market-based approaches that focus on afforestation for carbon markets, instead of securing timber and usufruct rights for minor forest products to benefit local communities (which women, especially poor women, depend on for livelihood needs)
<i>Gender-Sensitive</i>	Interventions recognize existing gender inequalities (but may fall short if they do not take into account caste/class-based differences).	Eliciting and supporting women’s existing/stated priorities for climate change adaptation activities. For example, introduction of “clean” cookstoves and energy-saving initiatives designed to reduce women’s drudgery and labor in fuelwood collection (and which simultaneously reduce smoke hazard and black carbon release).
<i>Gender-Transformative</i>	Interventions that aim to transform gender relations to promote gender equity across scales (i.e., between and within gender groups).	Policies that promote and protect women’s self-determination and rights, and which create spaces for men to benefit from women’s empowerment as part of the process. For example, mandated reservation quotas for women in decision-making bodies at all levels and creation of <u>new</u> institutions and networks that promote strengthening of gendered assets/capability (despite gender-based divisions of labor which remain may central to mountain livelihood strategies)
<i>Gender-Just</i>	Cross-cutting interventions that recognize the intersections of gender and other forms of difference and which achieve sustainable, <u>structural</u> changes in gender based power relations, eliminating societal acceptance of discrimination and violence committed as a result of gender inequality.	Recognition of the fluidity and changeable nature of gender identities and gender relations. Policies such as India’s recent decision to create three census categories for gender are headed in this direction, but mainstream approaches to climate-linked disaster planning that truly recognize the implications for “other” genders is not yet a reality. Climate justice will not be realized whilst women (or any other group) suffer disproportionately negative impacts.

**Figure 3.** Climate change adaptation practices – gender intervention typology (adapted from Kapoor, 2011).