



# Exploring gender approach to climate change and agroecology: Women farmer's search for agency in India ☆,☆☆

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## ABSTRACT

Employing the frame of gender and political ecology, this paper analyses the synergies of indigenous knowledge, agroecological farming and local conservation as a sustainable mitigation and adaptation strategy for climate change in Tehri Garhwal in the state of Uttarakhand, India. The study is based on field research conducted between 2017 and 2018 exploring how women's roles in regenerative agriculture provide them with agency. The nature of which has not been explored. While there is a need to mainstream such practices to sustain the commons and women's empowerment through structural, institutional and financial support, it is crucial to analyze the scope of this empowerment. This paper highlights the predicament of women farmers as their ability to exercise agency in the agricultural space does not necessarily translate into overall empowerment or a transformation of existing gender- and caste- based hierarchical power relations in society, as the latter will require interventions along multiple fronts.

## 1. Introduction

The impact of climate change is cascading in nature, its magnitude expected to increase over time; however, it will not be evenly distributed across different regions and communities.<sup>1</sup> Agriculture, the traditional livelihood activity in India and the Global South at large, will be most severely impacted due to its dependence on climate-sensitive resources (Meinke & Stone 2005). As this sector engages a majority of women, climatic variability would greatly impinge on their livelihoods and will magnify issues of food insecurity, loss of income, security and welfare (2013, Intergovernmental Panel on Climate Change (IPCC); 2014). The remedies of the climate induced adversities lie in the resilience of food and farming systems that may come in many forms. Dominant solutions featuring strategies of adaptation and mitigation are pegged to high-modernist scientific developments like biotechnology, marked by a strong concentration of corporate power which use them as opportuni-

ties for profiteering. These solutions do not take into account the complexities, trade-offs and synergies of the inter-dependent systems of local resources, and do not offer any sustainable, long-term solutions. On the other hand, agroecological systems with women playing a pivotal role efficiently harness the synergies of the local resources and indigenous knowledge needed to achieve resilience against climate change in food and farming. One such example is of Jardhar village, Tehri Garhwal in India where women farmers have spearheaded these practices and in the process acquired some sense of control over food, farming and their households, giving them a sense of agency. While the second option undoubtedly offers a grassroots solution that provides space for farmers' choices, autonomy and sustainability, it is important to analyze it on the axes of gender relations. With this background, this article explores the nature and scope of women's role in these practices, assesses the nature of fleeting agency acquired and the extent to which it does or does not translate into their overall empowerment.

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<sup>1</sup> Climate Change refers to the alterations in the mean climate that persists for an extended period (Inter Governmental Panel on Climate Change, 2007). It is widely manifested in the form of increased incidences of extreme weather events like droughts, floods, erratic precipitation resulting from rising temperature, chiefly attributable to anthropogenic activities.

**Table 1**  
Distribution of respondents in the field work.

Women farmers	30
Men farmers	10
Members of Mahila Mangal Dal	15
Leader of seed sovereignty movement (BBA)	1
Coordinator of seed sovereignty movement (BBA)	2
Development journalist	1
Total	59

### 1.1. Research design and methodology

The potential of regenerative agricultural practices in the mountain ecosystem of Tehri Garhwal, Uttarakhand, India for mitigation and adaptation is well known. In order to understand the different dimensions of these practices and synergies of local resource management, Jardhar village was chosen for field study due to the prominent role of women in agroecological farming there. This paper employs primary as well as secondary sources; field observations conducted in October 2017 and again in June 2018 have been analyzed in light of the existing literature in this domain. In-depth interviews of a variety of respondents were conducted to generate first-hand information and to capture on-the-ground realities of their farming practices, their understanding of climate change impact, and adaptive strategies undertaken (Table 1). Additionally, the oral narratives of farmers and their families, traditional folk songs, and customary practices associated with farming in the region were also explored to derive historical insight on the subject. The discussion in this paper also draws from a range of literature reflecting the critical thinking, theorization and practice at the interface of gender, climate change, agroecology and sustainable development in the past few decades. Shiva (1988, 2000) provides the ecofeminist perspective while Agarwal (1992, 1994, 2002, 2016) addresses the complexity of women, land ownership and agriculture. Pionetti (2005) explores women's role in seed and farm management in the Deccan Plateau, while Berkes et al. (2000), Gadgil et al. (1993), and Briggs (2005) highlight indigenous knowledge as a resilient tool of environmental and adaptive management.

This paper is organized into four sections. The first section introduces the subject matter, and the second section develops a conceptual framework to understand the gendered nature of climate change. Section 3 discusses the agroecological farming practices of Hainval valley regions of Tehri Garhwal, India as an efficient adaptation and mitigation strategy to climate change. Section 4 explores the nature and scope of agency arising from the pre-eminence of women in agroecology and resource management and conservation. The final section is constituted by the concluding remarks.

## 2. Gendered impact of climate change: A conceptual framework

Climate change is gendered in nature, demonstrated by its differential impact on women and men due to recalcitrant patriarchal arrangements endorsing gender-based inequalities in many societies. Given their socially structured gender-differentiated roles, men and women are affected differently by this phenomenon. Women face specific vulnerabilities arising from the traditional gendered roles they play in their families, communities and societies. The hierarchies and inequalities resulting from these arrangements severely limit their access to political, economic and social decision making. There are crucial literatures that examine different aspects of the gendered impact of climate change resulting in increased vulnerability of women to cope or adapt. For example, a culture-centered approach highlights the significance of cultural norms in defining gender roles, limiting the ownership, access and control of women over resources and information in a society (Thanker & Dutta, 2018). Pre-existing gender disparities reinforce capability asymmetries, reproducing the inequalities in access and control

**Table 2**  
Native paddy varieties/cultivars of Garhwal region, Uttarakhand, India.

Name of cultivar	Major growing areas
<i>Thapachini</i>	Hainval region
<i>Jhumaria</i>	Hainval region
<i>Safed sathi</i>	Hainval region
<i>Lal sathi/Sinoli</i>	Bhagirathi and Hainval region
<i>Halmunji</i>	Hainval region
<i>Basmati</i>	Hainval region
<i>Bonia</i>	Rawai and Hainval region
<i>Garuwa</i>	Hainval region
<i>Hansraj</i>	Hainval region
<i>Kala naledu/Mota Dhan</i>	Hainval region
<i>Mukhmalti</i>	Hainval region
<i>Lathmar</i>	Hainval region
<i>Ukhari Basanti</i>	Alaknanda and Hainval
<i>Garacha</i>	Hainval region
<i>Kala Mukhra</i>	Hainval region

Source: Mehta et al., 2014 On-farm status of rice (*Oryza sativa* L.) genetic resources in Garhwal Himalaya of Uttarakhand, India. *Genetic Resources and Crop Evolution* 61(7):1279-1294.

(Myrntinen, 2017). In this way, gender becomes the qualifier in determining choices, spaces and opportunities available to people, thereby determining their vulnerability quotient. However, there has been an inclination to overtly frame climate change in the semantics of Western scientific-technical discourse, highlighting merely its economic and technological aspects (Mainlay & Tan, 2012; Thanker & Dutta, 2018). Projecting a technocratic and value-neutral understanding of the concept conceals the dynamics of how specific variables like gender mediate its discreet impacts. It fails to capture how different people are affected, cope and adapt to the exigencies created by climate change.

In this light, this paper tries to understand the gendered vulnerabilities arising from the vagaries of climate change in the specific context of Tehri Garhwal in Uttarakhand, India. The Himalayan foothills have a historical legacy of agroecological farming and sound resources management; women play a central role in both of them (discussed in Section 3). The state of Uttarakhand possesses a wide range of locally adapted and resilient cultivars as shown in Table 2 (Bisht et al. 2007). However, the dynamics have changed after the adoption of modern High Yielding Varieties (HYVs) under the aggressive diffusion of the green revolution technologies, which were pushed by the government agricultural department in the lower Himalayan region in the 1980s (Gupta, 2008). Along with the spate of problems it resulted in, including environmental trade-offs, the new agricultural regime posed specific challenges to women farmers. The modern seeds deployed a new agricultural knowledge management emerging from scientific labs excluding women from the circles of knowledge and power available in the pre-modern HYVs paradigm. This resulted in their activities becoming less socially valued and obsolete. The financial burden arising from the cost of agrochemicals pushed families to recurrent debts and women felt the heat as they stood last in the hierarchy of needs in the patriarchal family settings. Hybrid HYVs did not have long stalks like the traditional native paddy varieties such as *thapachini* and *jhumaria* widely cultivated in the region and could not be used as forage for livestock and for thatching, magnifying women's burden of rearing livestock.

While all these problems resulting from the "seed-fertilizer" technology were adversely affecting farmers and farming, the challenges gradually increased multifold with rapid climate change. Rising temperatures, altered amount and intensity of precipitation, and diminished irrigation impacted the performance of HYVs, which were excessively reliant on agrochemicals and water—a highly climate-sensitive resource. Hence, there has been a return to agroecological farming utilizing native seeds by many farmers in the region. The rampant out-migration of men to cities for better opportunities and livelihoods has resulted in greater

feminization of agriculture not only in Tehri Garhwal, but in most of the districts in Uttarakhand. Men are generally present only for the preparation of the field, ploughing and fertilizer application while rest of all farm activities are performed by women. Given this situation, women bear the brunt of climate change as they are involved in labor intensive roles like sowing, rice transplanting, weeding, harvesting and threshing. Women interviewed during the field work reported that these tasks have become more arduous with unpredictable and harsh environmental conditions. They lamented that on the one hand, daylong farm work has exposed them to extreme weather, and on the other hand, household responsibilities have further intensified in absence of men. Most of the Garhwali women rear livestock-cattle, poultries, and goats as a part of mixed-crop-livestock system, but erratic and decreased rain from the past 10 to 15 years have been leading to the unavailability of fodder and water supply. Some of the women respondents reported that of late they have been buying fodder from the market. Additionally, one of the grave problems that resonated in the narration of all women interviewed, has been the replacement of subsistence food like millet (also referred as *mota anaj*), legumes and vegetables by large scale monocultures of modern seeds. This creates problems for women as they are in charge of food and nutritional security.

This paper also draws attention to the fact that there is a tendency to equate gender with women only and assume them to be a homogeneous undifferentiated mass. This is a grossly mistaken presumption and often casts women as hapless passive victims, devoid of any agency. On the contrary, women and their actions are defined by myriad social identity markers such as class, caste, ethno-religious background, cultural, social and economic differences, rural or urban location and so on. Gender connotes the construct of masculinities and femininities, the context-specific relationship between women and men shaping overall societal norms for both these categories. A gendered understanding of climate change is aware of these variabilities and cautions against erroneously essentialising women in terms of their inherent interest in environmentalism. Those women whose livelihoods are directly impacted by ecological degradation would have greater commitment to environmental causes (Agrawal, 1992). Women should not be seen only as victims of climate alteration, but as an active agent of change in the process of coping and adapting. As they hold specific knowledge, experience and perspectives, their participation in the climate change policy regime is required (Dankelman, 2010). The next section discusses the case of Jardhar Village, Tehri Garhwal, India, that represents a gendered perspective on adaptation and mitigation.

### 3. Adaptation and climate resilience: Agroecology, environmentalism and women farmers in Jardhar Village, Tehri Garhwal

#### 3.1. Agroecology and adaptation: A historical legacy

Most of the smallholders in Tehri Garhwal Uttarakhand, India follow holistic integrated mountain farming anchored in the epistemology of indigenous knowledge systems which has been their historical legacy (Pathak, 2021).<sup>2</sup> Intertwining a delicate balance of culture, autonomy and food production, such holistic practices are functional largely due to women's invaluable contribution. These practices, having a long history, are identified as a 'traditional' in common parlance. Though it is important to mention here that they have been part of lived realities of farmers who have hands-on innovated with the systems according to arising contingencies from climatic or social factors, while these systems themselves have been in interaction with the Western science in

<sup>2</sup> The state of Uttarakhand is primarily an agricultural state with a large number of smaller and marginal landholdings with rainfed agriculture (Government of Uttarakhand, 2021). The region of Tehri Garhwal has a history of environmentalism in form of famous Chipko Movement, heralding modern environmental consciousness in India.

one way or the other. In that sense they should not be seen in terms of binary of traditional versus modern as is the case usually (Agrawal, 1995). Agroecological systems have evolved in symbiosis with nature and have farmers in their centrality. Embodying context-specific knowledge sensitive to the local environment such practices offer grassroots alternatives in contrast to the dominant institutional response to adaptation and mitigation tethered with high modernist science (Altieri, 2011). High-tech solutions aggressively push for agribiotechnology for breeding climate resilient genetically modified (GM) crops, catering basically to the commercial competitive export-oriented agricultural sector. Such remedies entail gargantuan investments and dovetail into creating a complex, interlinked, monopolistic and mutually enforceable network for profiteering. They remain largely ignorant of the complexities of interrelated systems of local resources and production process and are neither people-centric nor sustainable in the longer run. On the other hand, grassroots solutions like agroecological farming not only are based on wider community participation but also give the recognition, control and sense of ownership to the people. Hence, they also appear just and democratic reflecting desirable political values.

#### 3.2. Agroecological practices as a gendered domain: The case of Tehri Garhwal

The agroecological practices in Tehri Garhwal are predominantly gendered in character as they have been operationalized by women who sustainably manage farm, seeds, crops and resources and are doyens of farming. As prime caregivers they have exclusive responsibility of procuring food, water, medicinal plants and firewood. In the process, women acquire a complex knowledge system about long-term adaptations of agriculture and local ecology that includes understanding of soil, pests, irrigation management, seed saving, seed selection and grain storage (Agrawal, 1992; Pionetti, 2005; Shiva, 1988). This specific and meticulous role of women and the material basis of their survival put them in an inextricable and sensitive relationship with the environment. One of the women respondent *Jamuna Devi* from the Jardhar village stated that they have seen their mothers and grandmothers performing the seed curation which is a specifically skilled task. She showed her paddy seed storage basket made up of bamboo with the mixed layers of cow dung and mud and informed that the preparation of storage pots/baskets not only differ based on the crops but also on differing agro-ecological and climatic factors in regions, knowledge of which is passed from one generation to another. *Jamuna Devi*, who is above 70 years of age, also emphasised that these aspects of farming have always been non-androcentric, marked by absence of men's decision making or interference in these matters thereby giving some control to women in natural farming. She further elaborated that this circumstance put women in their community in a state of greater say in household compared to those women who are engaged in conventional farming. The reason being, if the inputs are external and market purchased, neither the seed knowledge of women nor the skill to select seed or prepare organic pesticides or manage multi-crops are required. In this situation, women farmers are reduced to a farm laborer, toiling on a farm that runs basically to cater market or export. Also, the cash earned in this system directly go to men as they manage the farm budget and expenses making women more dependent in an already debilitating social structure. On the other hand, variety of vegetables grown by women in agroecological farming not only offers them income, but also helps them spend this little amount for the family's wellbeing.

The rising concerns for the rapid loss of agro-diversity due to monocultures, vanishing seed ownership and wider market dependency has led a movement to save the native heirloom varieties and revert to their indigenous hill farming practices in form of *Beej Bachao Andolan* (BBA) (Seed Saving Movement) (Singh, 2020). BBA has been popularly seen as a land-race renaissance movement under leadership of Vijay Jardhary with Garhwali women as the crusaders whose mobilization gained momentum under the ambit of *Mahila Mangal Dal*, a support group cre-

**Table 3**  
The crops of Baranaja.

Traditional/Native name	Common name
<i>koda/mandua</i>	Finger millet
<i>lobiya</i>	Cowpea/Black-eyed pea
<i>naurangi</i>	Rice bean
<i>rajma</i>	kidney bean
<i>jowar</i>	Sorghum
<i>bhat</i>	Black soybean
<i>tur</i>	Pigeon pea
<i>marsa/ramdana</i>	Amaranth
<i>gahat/kulath</i>	se Bean/horse gram
<i>moong</i>	Green gram
<i>urad</i>	Black lentil
<i>jakhya</i>	Wild mustard/cleome
Total	12 Crops

ated in 1986. This group carried out a door-to-door awareness drive for reverting to native seed saving and indigenous cultivation processes. Explaining the significance of seed saving Vijay Jardhary remarked, “*yadi Kisan ke haath se beej gaya to samjho azadi bhi gayee*” meaning that if the seeds go out of the hands of the farmers, there will be no autonomy for them.<sup>3</sup> Therefore, members have played a proactive role retrieving of local heirloom varieties, advocacy of natural farming methods that utilize supportive biological processes to improved yields and restoring indigenous knowledge systems.<sup>4</sup> The earlier head of *Mahila Mangal Dal* Bindu Devi in her interview said “We follow the famous hill proverb-*khad khana; beej dharna*- meaning one may eat manure if necessary but must preserve the seeds and teach the same to our fellow villagers.”<sup>5</sup> The commitment to seed conservation, crop and varietal diversification is representative of the wider culture of the farming communities of the hills that carries huge potential as a crucial adaptation strategy. Another respondent Kavita Dabral, a very active member of *Mahila Mangal Dal* said “We keep reiterating the philosophy of our elder- *Kya hain Jangal ke Upkar...Mitti, Pani aur Bayaar, Mitti Pani aur Bayaar...Jinda Rahne ke Adhar*” meaning “what are the blessings of the forest? Soil, water and air, which are the basis of life and the living world.”<sup>6</sup>

There are a range of agroecological practices observed in Jardhar village, *Baranaja* being an eminent one. It represents a local system of dryland farming with a custom of intercropping and mixed cropping twelve or more indigenous crops in the same field. The farmers divide their field into 2 parts- half the land is used for *baranaja* while the rest half is used for growing *ukkeri dhan* or dryland paddy and *Jhangora* or barnyard millet. This system follows the agricultural cycle of *kharif* crops in which seeds are sown in May/June and harvested in September/October. After harvesting of rice in October, the land is left fallow for 3 to 4 months for soil to rejuvenate. In the next crop cycle, instead of repeating *Baranaja*, barnyard millet is cultivated followed by wheat and then *baranaja* returns in the crop cycle. The objective of not repeating *Baranaja* and rotating crops in different cycles in the same field is to control weeds, pests and maintain soil fertility. The *Baranaja* crops include locally adapted cereals, legumes and lentils like oilseeds, millets, peas, beans, soybean, amaranth (Table 3). It is important to mention the special contribution of women in making it a successful practice. Because of their specific knowledge and skill pertaining to seeds, it is women who selected seeds of all twelve crops for saving and sowing based on their health, vigor, shape, size, color and odor. After the harvest, the grains

are stored by the women in pots as per requirement of the crop. Women also hold fair understanding of nutritional quotient and compatibility of crops used in intercropping and mixed cropping that acts as insurance of food security against droughts, floods and animals. *Baranaja* acquires crucial importance as an efficient instrument to address the challenge of climate change due to enormous biotic and abiotic stress of its crops, making it climate resilient. The biological analysis of such local cultivars prove them to be highly adapted to local conditions increasing their fitness to soil, pest, weather and climate conditions and may also offer higher palatability and other morphological advantage (Ellen, 2021). *Baranaja* immensely contributes to biodiversity conservation and maintaining ecosystem dynamics.

Besides, there are other agroecological practices primarily undertaken by women, like the tradition of preparing 2 kinds of manure-one for the summers and another for the winters. Leaves and grass are mixed with the cow dung and left in a pit to ferment and become compost to be used in the summers. The winter manure is basically prepared from the dry decomposed leaves and is used for the paddy. After harvest of crops, stumps are left in the field to rot and supply biomass to soil for the succeeding crops. Bullocks are widely used for ploughing as they maintain the necessary aeration in the soil, while their droppings further enrich the field. Women are also at the centre of pest management in which neem leaves, cow urine, garlic is used to prepare the liquid pest repellent. Biological pest control methods include some insectivorous birds such as crane, woodpecker, heron, *maina* that feed on crickets, grasshoppers, dragonflies, aphids, caterpillars and other pests that destroy crops. On Basant Panchami, which marks the beginning of new year and falls in the month of March, the seed storage pot called *bijunda* or *tomri* in Garhwali colloquia is taken out in the field to worship. One of the purposes of opening the seed pot that remains otherwise sealed is also to check the status of stored seeds. Irrigation is socially controlled by a *kul* system under *pani panchayat* that appoints a person to water different farmer's fields by *kyari* or water channels. Depending on the size of the field and requirement of the crop the water in charge regulates the supply and is paid by giving a part of harvest by the farmers. This not only saves water but also employs division of labor in the community.

### 3.3. Local control and conservation

The pursuit of conservation is integral to local customary practices related to farming in the hills. As the government intervention in this regard has not been effective, people have themselves constituted community institutions like *Van Surksha Samiti*, *Mahila Mangal Dals* and *Pani Panchayat* that enforce conservation rules and restore key ecosystems. Due to their specific pattern of environmental use, farms and local resource management, women have been at the forefronts of these local institutional initiatives. In Jardhar village as well as in nearby villages, a range of crucial issues are discussed in the meetings of *Mahila Mangal Dals* and the inputs are further conveyed and accommodated in the meeting of *Van Surksha Samiti* and *Pani Panchayat*. Women collectively decide in *Mahila Mangal Dals* to plant and maintain a variety of local vegetable and medicinal herbs surrounding their household as well as in other common areas for example, around the temple. They ensure that these sapling survive as many women also act as healers for their family, while some of them are community healers. Therefore, they ensure the biodiversity, but at the same time do not allow their fellow villagers to exploit excessively. They narrate folklores, especially to youngsters, about how overexploitation of herbs or other sacred plants/and tress can invite troubles, from the forest god and so on. It was also observed that women are involved in local management the distribution of water from natural occurring sources in their surrounding area. Men generally, do not get involved in these micromanagement as reported by the women from the field. This preeminent role of women in management of plant biodiversity and resource conservation can be noticed in other parts of the world as well (Howard, 2003). *Van Surksha Samiti* controlled forest fire, overgrazing, firewood collection in the Reserved Forest area while

<sup>3</sup> Based on interview with Vijay Jardhary, the leader of Beej Bachao Andolan, conducted in June 2018 at his native village Jardhar goan, Uttarakhand, India.

<sup>4</sup> Reported in the news in *Jagran* available at <https://www.jagran.com/uttarakhand/uttarkashi-mahila-mangal-dal-11613965.html> accessed 15.05.21.

<sup>5</sup> Based on interview with Bindu Devi, June 2018 in Jardhar Village, Garhwal, Uttarakhand, India.

<sup>6</sup> Based on interview with Kavita Dabral June 2018 in Jardhar Village, Garhwal, Uttarakhand, India

*Van Sewak* and *pani chowkidar* safeguarded water sources and regulated supply of water in the fields (Samdariya et al. 2008). The felling of green woods and bark of pine trees is prohibited and offenders are penalized by the Samiti. These self-organized community management systems are responsive, reflective and flexible, encouraging a range of practices like rotational grazing, use of cover crops, integrated pest management, agroforestry for ecological integration and self-regulation. However, hierarchies along the lines of caste and gender within the community also play a role in shaping this self-organized community system. For example, larger body of community institutions is also gendered, marked by predominance of men.

#### 4. The search for an agency: Critical evaluation

From the discussion in the preceding section, it is evident that agroecological practices like *baranaja* offer the highest resilience against climate change and addresses the adversities with an integrated environmental and development approach. Alongside, it also endows women with an agency emerging from greater control, ownership, improved nutritional security and overall wellbeing.<sup>7</sup> Agency refers to the “ability to define one’s goals and capacity to act on them,” to make choices, bargaining, negotiation, resistance (Kabeer, 1999, p. 438). The farm-saved native seeds give women freedom from market dependence for seed or agrochemicals and choice to plant them according to their convenience of time. Agency when combined with resources constitute capability (Sen, 1985): the practice of *baranaja* provides women freedom and choices while local plant species serve as resources giving them capability to provide diverse nutritious food to their family with minimal cost inputs. Agency helps women farmers achieve empowerment through these roles, granting them the bargaining power to negotiate better at a household level with their daily battles of domination and resistance in the patriarchal family settings. For example, women farmers reported that they have predominant role in the natural farming as all the inputs are in-farm and are prepared by women. Hence, they are allowed socially to sell or barter some crop/vegetable with fellow women farmers and generate cash income. Men generally do not take-away this cash; even though it is very little, yet this cash in their hand gives them space to manage household independently. Few men even find this income crucial, given the precarity of farming conditions combined with rising inflation as reported by some women. This gives them a sense of control compared to other women who do not farm or farm chemically. However, women also reported that when it comes to big decisions in farming like whether to shift to conventional farming of to adopt hybrid seeds, men prefer to consult fellow farmers than just rely on women’s choices about crops or associated matters. Women generate support system by mobilizing through specific groups such as *Mahila Mangal Dal* and informal networking that imparts them greater visibility and identity as farmers in the community. Most women in their interviews reiterated that farming has been a male bastion, but women’s participation in seed selection, preservation and grain storage enable their decision making in farming, even though in a limited sense. One of the respondents Yashoda Devi stated, “Men allow us to make choices in selection of crops, seeds, manure and organic pest management because of our knowledge and expertise.” The statement itself shows the entrenched dominance of men as in most cases lands are in their names.

However, a critical analysis of the nature and scope of this agency displays its multi-layered character adding to its limitations in serving as a larger instrument of empowerment of rural women. Despite the diverse productive and reproductive role of women in family and community, patriarchal order mediates their access and control of resources. Although women’s participation in agriculture is defined by a gender gap globally (Huyer, 2016), but it is stark in developing countries. Women

constitute more than 42% of agricultural workforce in India yet own less than 2% farmland, as found by India Human Development Survey jointly organized by the University of Maryland and the National Council of Applied Economic Research.<sup>8</sup> In case of Uttarakhand, the gap is manifested in women’s lack of land ownership and access to resources and markets resulting in invisibility of gender in agriculture. Most of the opportunities in farming such as extension services and credit are pegged on to land entitlement hence, women are deprived from them. The vagaries of climate change in the form of increasing erosion and desertification diminishes their access to productive land and may displace them to distant fragile territory. Women’s predominance in the operationalization of agroecological farming in Jardhar Village has not translated into closing the existing gender gaps in agriculture and has failed to ensure a wider gender-equity outcome. This fact can be observed in other environmental movements of this region like Chipko Andolan as well, in which women’s central role and leadership did not culminate into substantial improvement in their overall status. The reason being the overarching patriarchal societal structure, cultural norms and highly gendered household that remains untransformed by women’s participation in few aspects of farming. Women’s subordination is reflected in day to day practices and living, for example, cooking and domestic chores are seen exclusively as their responsibility. Women respondents also reported that in the household they always eat last for, they belong to lower rung of family’s priority. They said that their mobility is strictly guarded by societal norms, allowing them limited interactions with other men from whom they may get farm related knowledge. They are married off quite early and the choices in marriage are largely determined by the family. Because of these reasons, better intra-household bargaining power along with increased mobility and access to assets indicates empowerment in some contexts, but may not generate similar emancipatory avenues in other contexts. The social, cultural, economic and political aspects of the society remain firmly entrenched in patriarchal norms which reinforce women’s subordination and traditional gender roles. While this culture of gender inequality informs the various institutional domains and the public spaces, the recalcitrant patriarchal arrangements and values of community are seldom questioned by the women for the fear of discord in marital relationships. The issues of ownership, control and access of resources act as impediments in achieving gender justice in the agrarian settings and stifle women’s agency. Therefore, women’s autonomy and empowerment become difficult to achieve in most of the agrarian societies.

Along with the existing patriarchal order, hierarchies arising out of caste and class also intersect with women’s agency, therefore, all women may not have equal access, opportunities and voices. In the total population of 1413 in Jardhar village, 17.8% is constituted by Schedule Caste, while there are no Schedule Tribe according to caste data as per Census, 2011. About 70% of the population belongs to the Negi Rajput caste who call themselves *meji jardhary* and while approximately 10% belongs to the *Thapa* community who migrated from Nepal some 70/80 years before. The men of the schedule caste or Dalit families are engaged in profession like *dhol wadak* (drum beater), blacksmith while women of all caste and class are involved in farming, though nature of their involvement differ. Most of the women respondents interviewed belonged to Negi Rajput caste having larger fields while a few belonged to *Thapa* with relatively lesser and smaller fields. When asked about the caste affiliations, respondents expressed that they identify themselves primarily as Garhwali, though they opened up later which indicates relatively lesser perceptibility of caste stratification compared to other parts of the country. However, from the individual and group conversation, it clearly emerged that a few Dalit families owned land and their women usually toiled on other’s fields. Their landholdings were of smaller size falling into *ukkar* or dryland. Dalit women do participate in the *pani panchayat* and *van suraksha samiti*, but their voices are subsumed in the

<sup>7</sup> Based on the interview of women farmers conducted by the author in October 2017 and June 2018 in Tehri Garhwal, Uttarakhand, India.

<sup>8</sup> Refer <https://ihds.umd.edu/data> for details.

dominant voices of the community. These indicate the power dynamics across these groups as land size not only denotes the extent of prosperity but also access to other resources and social status. Groups do help each other during ploughing, they lend bullocks and share labor in paddy transplantation but labor sharing is preferred with neighboring farmer rather than evolving or institutionalizing labor sharing through concrete community practices. A common problem that pervaded the entire village was that of monkeys and wild boars invading crops at night making farmers stay overnight in the fields for the vigil.

Equally important is to question the traditional agriculture and indigenous knowledge systems for its inability to address the question of patriarchal culture and hierarchies in farming that defines agrarian communities. Engaging with indigenous knowledge uncritically may lead to import of hierarchies and distortions which would make it undemocratic. The accessibility of Indigenous knowledge could be mediated by a range of “factors such as age, experience, wealth, production priorities, household circumstances, political power and gender” (Briggs, 2005). These systems may themselves be embedded in socio-cultural hierarchies and the mobilization that foregrounds the agroecology might well be marginalizing certain farmers on the basis of caste, gender, possibly religion or any other criteria (Singh, 2021). For example, the practice of baranaja despite its adaptive potential, is seen as irrelevant by the youths of Garhwal partly because of a larger disenchantment with farming itself and partly because of adverse political-economic changes in and outside agriculture, which explains why it has not been widely adapted in the region despite its values. One of the problems with such agroecological practices has been that due to the legacy of Chipko Andolan, the Garhwal region started receiving a lot of international attention, especially from Western media, projecting leaders are the frontrunners. Leaders also, in turn, began focusing on global advocacy and association rather than addressing local issues and challenges (Brown, 2018). This region has been unable to address declining relevance of farming to the young generations abandoning farming in the hills and migrating to the cities for livelihood.

Accomplishing larger feminist goals would be possible by simultaneous layering of desired changes in all spheres determining women’s empowerment. In other words, different factors including change in cultural norms, societal patterns, equality in economic and political opportunities have to come into alignment that can cumulatively result in achieving goals of gender justice and empowerment. For example, many women expressed the lack of educational institutions in the nearby areas. Boys manage to travel far for school and colleges, but girl’s mobility are restricted. They believed that the government must be sensitive to these aspects and should also open vocational institutes to impart technical skills so important for employment. In absence of these, women were hardly employed in any other sector. Another aspect that could assist in overall empowerment that these women felt is to fill the gender gap in policy as well. Despite women’s innovative grassroots engagements in farming and climate mitigation, they hardly figure in the planning and policy processes. This is also a global phenomenon as climate change negotiations states and multilateral agencies are marked by conspicuous absence of women and deliberation on gender aspects.

Women’s agency is not a static one and is also changing over time assisted by many factors. For example, Uttarakhand Government granted the co-ownership rights to women in husband’s ancestral property through an ordinance passed in 2021.<sup>9</sup> This is seen as a historic decision in light of mass urban migration of men and would also enable women to avail credit and other governmental assistance. Similarly, the Government of Uttarakhand has also fixed lower stamp duty registration charges of 3.75%, whereas it remains 5% for men, aiming for larger

<sup>9</sup> For details see <https://economictimes.indiatimes.com/news/politics-and-nation/uttarakhand-government-brings-ordinance-to-give-co-ownership-rights-to-women-in-husbands-property/articleshow/81114738.cms>.

property registration in women’s name.<sup>10</sup> Garhwali women also stated that the scenario is changing with a greater drive towards girls education and parents not marrying them very early like the earlier times. The field observations confirm that farm empowerment of women mutually reinforces their status and security enhancement in the household and community. They can also serve as the efficient medium of women’s empowerment because the resources management remains in the hands of the people, and would enable them to frame the solutions appropriate to their context. Many sustainable farming organizations have also emerged that work in this area to enhance women’s farm empowerment. Hence, the policies must reorient themselves by mainstreaming agroecology, syncing the indigenous knowledge with the scientific breeding and farm innovations and positioning women in the centrality of the discourse of climate change. This would also instil a sense of co-ownership and collaborative action for co-creation of knowledge and policy for climate resilience.

## 5. Conclusion

Drawing from the gendered dimension of agroecological farming and collective action around them like BBA, this article conclusively suggests their sustainable intensification as mainstream adaptation and mitigation strategies. Such practices with women’s pivotal role in seed curation and sustaining informal seed systems acquire greater significance not only for ecologically efficiency but also for their potential for serving as the tools of women’s upliftment. Even if women’s participation in agroecological farming isn’t empowering women in all spheres, it is having some benefit like supporting better household nutrition and resilience in the face of shocks. In a decentralized, community-controlled food and farming systems based on local food supply chains women farmers can control their food and nutrition basket by farming those crops that they want to serve to their families. Such practices are reorienting farming knowledge and practices by harnessing the synergies of ecological functionalities of agricultural systems, the optimization of natural processes, and the frugal management of resources to achieve improved ecosystem services. In fact, women have been engaging with these strategies long before adaptation and mitigation for climate change became topical (Johnson & Worstell, 2015). On the other hand, the international focus on research strategies for the vulnerable to combat climate change is very recent in origin (Reid et al. 2013). System adaptability to shocks makes agroecological systems resilient and with the deepening of the climate crisis they are needed more than ever. However, the challenge remains that such practices continue to exist on the margins and have yet not been mainstreamed due to lack of appreciation and the required government support.

Another pertinent fact emerging from the discussion is, despite its paramouncy in agroecological farming and climate resilience, women’s role has not translated to larger feminist goals and overall empowerment, though it has potential for the same. The agency that they acquire from their participation in agroecological practices remains limited due to overarching patriarchal family, community and societal structures. These aspects have been largely overlooked by the research work, policy and programs in this area. Neither these practices, nor women who are their frontline operators, get recognized in the formal discourse of climate change and its global and local institutional redressal mechanisms. However, there are some positive attempts as discussed in the previous section. More such policies that support and expand women’s entitlement, education and skill enhancement along with gender-just mitigation strategies will help in the cumulative gender empowerment. Additionally, foregrounding and supporting the pre-eminence of such local agroecological practices with ubiquitous women’s participation will gradually shift the orientation of adaptation policies from techno-

<sup>10</sup> Refer [https://registration.uk.gov.in/files/Stamps\\_and\\_Registration\\_-\\_Stamp\\_Fees\\_Regn\\_Fess.pdf](https://registration.uk.gov.in/files/Stamps_and_Registration_-_Stamp_Fees_Regn_Fess.pdf).

centric approach to those inclusive and representative of local culture, people and their environment. This explicates the necessity of exigent engagement with these local knowledge practices, their integration in the policy regimes on climate change, their upscaling and sustainable intensification because of their pertinence for mitigation, adaptation and women's empowerment.

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