Gender Disparity in Agricultural Resource Management: A study from Uttarakhand for Climate Mitigation and Sustainable Development

Abstract

Among the drudgery-prone occupations in the unorganized sector, where most women work, is agriculture. Planting, transplanting, weeding, thinning, harvesting, winnowing, processing, selling, storing, taking care of animals, kitchen gardening, and other chores are just a few of the numerous jobs that women perform in the agricultural industry. The current study aims to evaluate the disparity between genders in the agriculture sector's resource access. The study was conducted in two districts of Uttarakhand, AER 9 (Udham Singh Nagar) and AER 14 (Almora). The study area and samples were chosen using a combination of random selection and the purposeful sampling technique. There were 240 samples in all. With 80.33–98.33% of respondents having minor agricultural implements, the bulk of respondents have over 15 years of farming experience. When it comes to labor and marketing, men rule, although women are more likely to help with weeding and produce sorting/storage. Very few households own large farm implements. Men handle land-related chores and chemicals, equipment, and fertilizers, whereas women are more likely to work on off-farm tasks like gathering firewood and fetching water.The data showed that there exist gender differences in access to and control over important farm resources, with men typically occupying more powerful roles, especially when it comes to important decision-making domains like land transactions and the procurement of tools and implements. The percentages for female and joint control indicated regions that might be targeted for the promotion of equal access to and control over agricultural resources through gender-inclusive policies and actions.

Keywords: drudgery, agriculture, resource access, decision making, gender inclusive

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INTRODUCTION

Among the drudgery-prone occupations in the unorganized sector, where most women work, is agriculture. Planting, transplanting, weeding, thinning, harvesting, winnowing, processing, selling, storing, taking care of animals, kitchen gardening, and other chores are just a few of the numerous jobs that women perform in the agricultural industry. Many people in Uttarakhand, particularly those who reside in the state's mountainous regions, work in agriculture, which is the main source of income for the state. Since agriculture provides them with bread and butter, many ~~Uttarakhandi~~ Uttarakhandhill people still make agriculture their primary source of income. As men migrate from the hills to the cities in search of better employment, women of Uttarakhand are still ~~also~~ engaged in agriculture.

Lack of land holdings, identity as farmers, unequal resource distribution, and technology constraints are the main challenges faced by women in rural farming. In addition to having to deal with a lot of housework, rural women have access to antiquated tools designed only for men, which makes the arduous labor on the farm even more challenging and time-consuming. Additionally, their incapacity to obtain contemporary technologies reduces their output at the farm (Joshi and Chaudhary~~et al.,~~ 2021).

The irony is further compounded by the fact that almost 40~~%~~ percentof the population lacks any land ownership. This is especially important for women, whose land ownership rates vary from 1 to 34 percent in each state, with the national average being 13.5~~%~~percent(CIWA, 2016).

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Implementing new technologies to alter farming practices or making current tasks easier or more productive for the labor force already in place are the two approaches to reduce the workload (i.e., time and energy) that women carry in farming operations. Changing existing methods or utilizing new technologies can often lessen women's workloads, but doing so requires outside help, more expertise, and coaching (Aryal *et al.*, 2019).

It is commonly acknowledged that reducing gender disparity promotes agricultural growth and the achievement of food and nutritional security on a global scale. About one-third of the labor force is made up of women, who make up roughly half of the world's population. The status of women in the household and their rights to equality with men in other spheres of social life are no longer the only issues pertaining to women today.

Kabeer (2012) noted that along with education,women's employment seems to contribute to growth and help convert economic expansion into increased gender equality in a variety of ways. The intersection of gender-specific constraints reflecting the rules, norms, roles, and responsibilities of the inherently gendered relations of family and kinship with the "imposed" constraints embodied in the rules and norms of the ostensibly gender neutral institutions of states, markets, and civil society, as well as the attitudes and behavior of various institutional actors, is reflected in women's lower labor force participation rates compared to men and their concentration in the poorest segments of highly gender segmented labor markets. The continuance of gender disadvantage in the labor market would limit women's ability to obtain jobs on equal terms to men, even if more jobs were made available as a result of increased focus on employment-centered growth. Therefore, a deeper comprehension of how these limitations manifest in various socioeconomic circumstances and what can be done to change them is necessary for the economic empowerment of women.

When it comes to employment, education, and health, there is a gender disparity (Mahanta and Nayak~~*et al.*~~, 2013). Even though there are more women employed in the industry, they face certain challenges that lower their output (Joshi *et al.*, 2021).
Akter *et al.*, (2017) revealed trends that contradict the conventional narratives of gender inequity in agriculture in certain domains of empowerment. In Myanmar, Thailand, Indonesia, and the Philippines, women seem to have more influence over household income and equal access to productive resources like land and inputs. In terms of empowerment at the community level, significant intra-regional variation is noted. In Thailand and the Philippines, women actively participate in agricultural groups, while in Indonesia and Myanmar, this is primarily a male domain. These results suggest that in order to close the gender gap in agriculture, gender intervention strategies tailored to each nation are required.

Jayakumar ~~*et al.*~~and Surudhi (2015) carried out to ascertain the representation of women and their academic achievement in agricultural education. The results of the survey showed that women were nearly equally represented in agricultural courses and received higher-quality education, including private schooling and English-medium instruction. Women were more likely than men to ~~enroll~~enrol in agricultural courses, according to recent patterns during the previous four years. Additionally, the increase rate for female students was higher. Additionally, women's academic accomplishment percentages were noticeably greater than men's. These encouraging signs have a good impact on the future growth of the agriculture industry and send strong enough signals for women to be treated equally in agricultural courses.

Jayachandran (2014) showed that gender gaps in several domains are large in developing countries and laid out several mechanisms through which, as countries grow, women's lot

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should improve. First, there is a sectoral change from agriculture to services. Second, the time required for domestic duties is decreased by technological advancements. Third, there is a decrease in the likelihood and frequency of childbearing. Every one of these elements raises women's labor force involvement, which raises investments in human capital for girls and women's individual freedom. ~~Jayachandran~~ He discussed cultural customs including patrilocality and male-centered burial rites that may contribute to gender inequity in today's developing nations despite economic progress. For instance, the highly male-skewed sex ratio in China and India can be explained by these cultural standards. Likewise, the unusually low rate of female labor force involvement in North Africa, the Middle East, and India is probably due to the importance these cultures place on women's "purity." Gender disparities may eventually close as a result of the natural decline of male-oriented cultural institutions brought about by economic modernity, but politicians may also be able to hasten this process.

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In the chosen study regions, gender disparity arises from factors such as land ownership and decision-making, household economics, and involvement in communal affairs. More research should be done on the disparity between the qualitative and quantitative results, particularly with regard to the income contribution of women in the home. Men and women may have taken unilateral rather than cooperative actions to combat harsh weather conditions as a result of their ignorance of climate change and variability. Individual actions like taking out loans and enlisting the assistance of extended family members might strain relationships within the family and lead to future injustices (Xenarios*et a.l*, 2017).

Despite the fact that agricultural research has advanced sufficiently, there is no coordination between the research labs and farms in the various agroclimatic zones of the nation. As a result, ordinary cultivators—particularly marginal and small farmers—do not benefit from new agricultural research. Education and training farmers to adopt new agricultural ideas and approaches to boost agricultural production is receiving very little attention (Selvan *et al.*, 2023).

METHODOLOGY

The aim of present study is to evaluate the disparity between genders in the agriculture sector's resource access in Uttarakhand. The methods and procedures developed for conducting the study are presented as follow:

Universe of the Study

Uttarakhand is where the current study was carried out. The state of Uttarakhand is divided into 13 districts and two divisions, Kumaon and Garhwal, namely, Uttarkashi, Deharadun, Rudraprayag, Pithoragarh, Pauri, Tehri, Champawat, Haridwar, Chamoli, Almora, Bageshwar, Nainital, and Udham Singh Nagar.

Locale of the Study

Mid hill and ~~tarai~~ Tarai region of Kumaun division in Uttarakhand were selected for the study purposively.

Sampling Procedure

A combination of the purposeful sampling technique and random selection was used to choose the study region and samples. Purposively, the districts of Almora and Udham Singh Nagar were chosen for the study. Rudrapur and Gadarpur blocks were chosen at random from Udham Singh Nagar district, while Takula and Dwarahat blocks were chosen at random from Almora district. Each of the chosen blocks has two villages chosen at random. As a result, the study sample consisted of eight villages.Total 240 farm women were selected from eight villages, in which thirty farm women were selected from each village.

Data Collection Tools and Techniques

Descriptive data was collected for the selected samples through survey method. Appropriate statistics such as frequency, percentage, etc. were used to analyse the data.

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RESULTS AND DISCUSSION

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Years of Farming of Respondents

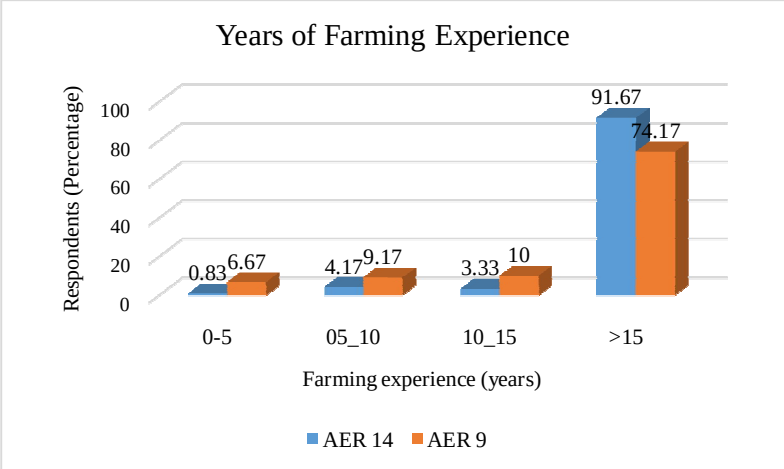

Fig 1: Years of farming experience

Figure 1 depicts the distribution of farming experience among individuals across different regions, showcasing their proficiency in various aspect. Each row represents a range of years of farming experience, categorized into 0-5 years, 5-10 years, 10-15 years, and over 15 years. The columns correspond to different regions, namely AER 14 and AER 9.

The values within the table represent the percentage of experience in farming for each respective region and experience range. For instance, in the last row (>15 years of experience), individuals from AER 14 exhibit a proficiency of 91.67%, while those from AER 9 have an experience of 74.17%. Similarly, the percentages indicate the proficiency level for each region and experience range combination. The data shows that majority of the respondents were having experience of more than 15 years in farming.

Gender participation

Table 1: Gender participation in different activities (N= 240)

Sr. No.	Gender participation in different activities	Male (%)		Female (%)		Both (%)	
		AER 14	AER 9	AER 14	AER 9	AER 14	AER 9
1	**Agriculture**						
	Field preparation	11.67	21.67	25	20	63.33	58.33
	Sowing/ planting	20	11.67	30.83	30.83	49.17	57.5
	Weeding	11.67	10	56.67	40	31.67	50
	Application of manure & fertilizer	11.67	22.5	25	25.83	63.33	51.67
	Harvesting	12.5	15.83	24.17	26.67	63.33	57.5

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	Sorting and storage of produce	13.33	12.5	30	27.5	56.67	60
	Marketing	20.83	57.5	15.83	23.33	63.33	19.17
	Engagement of labour	26.67	86.67	40	9.17	33.33	4.17
	Management of cash	10.83	20.83	21.67	18.33	67.5	60.83
2	**Off farm**						
	Collection of firewood/fodder and water	0.83	5	71.67	30	15	43.33
	Carrying water	2.5	-	55	-	42.5	-
	Cutting and gathering	2.5	5	71.67	30	25	43.33
	Collection and bringing back to home and storage	0.83	5	55.83	30	43.33	43.33
3	**Livestock management**						
	Cattle grazing	16.67	17.5	48.33	38.33	32.5	22.5
	Shed management and rearing	25	5	37.5	41.67	35	31.66
	Milking	5	18.33	42.5	21.67	50	38.33
	Marketing of produce	13.33	55	36.67	6.67	47.5	16.67
	Vaccination	13.33	23.33	25.83	5.83	45.83	49.16
	Others	5.83	44.17	21.67	5.83	54.17	28.33
4	**Kitchen gardening**						
	Fencing	3.33	2.5	26.67	22.5	70	75
	Vegetable Production	0.83	8.33	29.17	26.67	70	65
	Sowing	0.83	0.83	27.5	28.33	71.67	70.83
	Harvesting	0.83	10.83	35.83	28.33	63.33	60.83
	Marketing	5.83	84.17	20	5.83	74.17	10
5	**Homestead**						
	Payment of electricity bill/bank	55	65.83	26.67	19.17	18.33	15
	Cooking	3.33	1.67	80	85.83	16.67	12.5
	Child care	0.83	0.83	70.83	77.5	28.33	21.67
	Washing & Cleaning	5.83	2.5	79.17	86.67	15	10.83

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The table 1 outlines the participation of ~~males~~male, ~~females~~female, and both genders in various activities across different sectors. The activities are categorized into specific areas such as agriculture, off-farm tasks, livestock management, kitchen gardening, homestead chores, and fishing

Agriculture tasks were related to field preparation, sowing/planting, weeding, application of manure & fertilizer, harvesting, sorting/storage of produce, marketing, engagement of labor, and cash management whereas off farm includes tasks like collecting firewood/fodder, water, and carrying water. Livestock Management involves cattle grazing, shed management, milking, marketing of livestock produce, vaccination, and other related activities. Kitchen Gardening includes activities such as fencing, vegetable production, sowing, harvesting, and marketing.

Homestead tasks like paying bills, cooking, child care, and cleaning were also included in assessing gender participation.

Participation of male in agriculture activities like engagement of labor and marketing (26.67% & 20.83% for AER14and 86.87% & 57.5% AER14 respectively) was dominating while females in AER 9 had higher participation in activities like weeding, sowing and sorting/storage of produce. Females in AER 14 had higher participation in activities like weeding, engagement of ~~labour~~ labor and sowing.Off-farm activities in AER 14 showed a significant female involvement in tasks like collecting firewood/fodder, carrying water, cutting and gathering and collection and bringing back to home and storage while in AER 9 off farm activities showed shared participation. Livestock management involves shared responsibilities, with males predominantly engaged in activities like marketing of livestock produce in AER 9 and shed management and rearing in AER 14 and females contributing significantly to cattle grazing and milking in AER 14 and cattle grazing and shed management and rearing in AER 9.

Kitchen gardening tasks demonstrate a shared participation between genders. Homestead chores like cooking, child care and washing and cleaning show predominantly female participation in both the regions.

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Possession of Farm implements

Table 2: Farm implements of selected respondents of Uttarakhand of AER14 and 9 (N=240)

Sr. No.	Farm implements	Own (%)		Hired on rent (%)	
		AER 14	AER 9	AER 14	AER 9
1	Sickle	95	98.33	1.67	1.67
2	Shovel	97.5	93.33	1.67	1.67
3	Pick axe	87.5	80.83	10.83	10.83
4	Posting digger	7.5	5.83	91.67	91.67
5	Agricultural hoes	4.17	9.16	95.83	90.83
6	Chaff-cutter	-	78.33	-	-
7	Agricultural plough	-	12.5	-	87.5
8	Harrow	0.83	15.83	34.17	70.83
9	Sprayer	9.17	28.33	89.17	71.66
10	Water pump	4.17	64.17	-	35.83
11	Land leveller	3.33	8.33	95.83	91.67
12	Thresher	1.67	6.67	96.67	93.33
13	Tiller	0.83	2.5	9.17	68.33
14	Tractor	-`	15.83	-	84.17
15	Seed cum fertilizer	1.67	4.17	98.33	95.83
16	Combine harvester	0.83	4.17	6.67	86.67

Table 2 presents data on the ownership and rental usage of various farm implements. It can be observed from ~~Table~~ table that small farm implements like sickle, shovel, and axe were owned by majority of the respondents 80.33 to 98.33 percent whereas large farm implements were possessed by few of the respondents and were used on hiring basis by rest of the households in both the agro ecological regions.

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Access and controlover resources

Table 3: Access and control of gender over farm related resources (N= 240)

Sr. No.	Sub activities	Male (%)		Female (%)		Both (%)	
		AER 14	AER 9	AER 14	AER 9	AER 14	AER 9
1	Use of land	60.83	80	9.17	5	30	15
2	Purchase of land	88.33	90	5.83	5.83	5.83	4.17
3	Sale of land	65	95	10.83	1.67	24.17	3.33
4	Tools and implements	56.67	78.33	10.83	10	32.5	11.67
5	Improved seed	60	65	12.5	15	27.5	20
6	Fertilizers	61.67	55.83	13.33	11.67	25	32.5
7	Insecticides/pesticides	60	65	8.33	10	31.67	25
8	Retention for household purpose	65	53.33	16.67	21.66	18.33	25
9	Retention for commercial purpose	55.83	65.83	16.67	11.67	27.5	22.5
10	Management of cash	50	55.83	19.17	15	30.83	29.17
11	Credit	60	64.17	20	14.17	20	21.67

This data in Table 3 highlights gender disparities in access and control over critical farm-related resources, with males generally holding more dominant positions, particularly in key decision-making areas related to land transactions and tools/implements. The percentages for female and joint control suggest areas where efforts for gender-inclusive policies and interventions could be focused on promoting equitable access and control over agricultural resources. Males predominantly control land-related activities like use, purchase, and sale in both the AER.

Tools, fertilizers, improved seed and chemicals are also more within male controlwith significant involvement from females and joint control.

Retention for household and commercial purposes was indicating male decision-making or control over resources for domestic use in both the AER.

CONCLUSION

Agriculture, a drudgery-prone sector, is predominantly occupied by women, particularly in Uttarakhand, a region with hilly areas. They perform various tasks such as planting, transplanting, weeding, harvesting, and processing. Women contribute to agricultural growth and food security, making up nearly half of the global population and one-third of the labor force. Addressing gender inequality is crucial for women's rights and equality in various aspects of life.The current study aimed to evaluate the disparity between genders in the agriculture sector's resource access in Almora district of Uttarakhand state.The data indicated that most respondents have over 15 years of farming experience, with males dominating labor and marketing activities, while females in AER 9 and AER 14 have higher participation in weeding, sowing, and sorting.In AER 14, females significantly participated in off-farm tasks like collecting firewood and water, while in AER 9, they shared livestock management

responsibilities. Kitchen gardening tasks were also shared between genders. Homestead chores like cooking, child care, and washing were predominantly female in both regions.The majority of respondents own small farm implements like sickle, shovel, and axe, while few own large ones and use them on a hiring basis in both agro ecological regions.The data reveals gender disparities in farm-related resources, with males holding more dominant positions in key decision-making areas. Male's control over land-related activities, tools, fertilizers, seed, and chemicals. . Female and joint control suggests gender-inclusive policies could promote equitable access and control over agricultural resources.

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