Original Research Article

A Socio-economic perspective on Work Participation in Agriculture: Gender Based Analysis in West Bengal

ABSTRACT

This study examines gender disparities in agricultural work participation across West Bengal from the 1960s to 2011, revealing consistently higher male engagement with significant regional variations. Districts such as Purulia, Hooghly, Bardhaman, and Bankura recorded higher female participation, whereas urbanized areas like Howrah, Nadia, and 24-Parganas showed lower involvement. The Work Participation Rate (WPR) in agriculture peaked in the 1980s but declined thereafter, reflecting economic diversification and a shift toward non-agricultural livelihoods. Despite constituting a substantial share of the agricultural workforce—estimated at 38–45.3% in developing countries—women often remain overlooked contributors, primarily engaged as unpaid or low-wage labourers without formal recognition. Structural barriers, including limited land ownership and exclusion from decision-making roles, continue to reinforce gender inequities. While advancements in science and technology have transformed agriculture, they have failed to address the persistent marginalization of women in the sector. In India, agriculture continues to absorb female labour but does not formally acknowledge them as hired or employed workers. Addressing these systemic challenges is crucial for achieving gender equity and sustainable development. The findings underscore the urgent need for policy interventions that enhance women's access to resources, recognize them as farmers, and ensure their equitable inclusion in agricultural growth. Future research should focus on primary data collection to capture region-specific insights and assess the impact of gender-focused agricultural policies.

Keywords: Agricultural Workforce, Gender disparity, Work Participation Rate (WPR), Cultivator (M/M), Cultivator (F/F)

1.INTRODUCTION

Agriculture is the backbone of India's economy and the largest sector contributing to its economic growth. As a primary sector, it plays a crucial role in both developing and developed nations. India ranks second globally in agricultural productivity. In West Bengal, agriculture dominates both the landscape and economy,

with one of the highest proportions of agricultural land among Indian states. Women are the unsung contributors to Indian agriculture, yet their role remains largely unrecognized. Despite their significant involvement, they face challenges such as limited access to resources, lack of opportunities, and social backwardness. Despite their contributions, rural development policies often overlook women's needs. Globalization, economic integration, commercialization, urbanization, and technological advancements have impacted rural women across Asia. However, many still remain "invisible workers." Throughout the 1980s and 1990s, gender-based research sought to highlight their roles and challenges, emphasizing the need for policies that acknowledge and support their contributions. Bhattacharya and Ghosh (2009) studied female work participation in agriculture across five leading SAARC nations, examining trends, hierarchical clustering, literacy influence, and future projections for economically active female agricultural populations. Chakraborty and Chakraborty (2019) examine female work participation in West Bengal is low but varies across blocks. Factors like literacy, land ownership, and religion influence participation. Both men and women engage in low-skill, low-wage work. Singariya and Shekhawat (2015) analyzes female labor participation trends in Rajasthan, highlighting rural-urban disparities. In 2011, 11.6 million females were employed, mostly in rural areas with low-wage agricultural jobs. Urban women work in higher-paying sectors. Using Pooled OLS and Quantile Regression, findings reveal female literacy negatively impacts participation, while Scheduled Tribe population share has a positive effect. Household industry employment negatively affects both rural and urban female participation. The study suggests promoting education-based employment for rural women to improve work participation. According to Bhattacharyya and Bhattacharyya (2017) Male participation in agriculture remains higher than female, with a declining Work Participation Rate (WPR) since 1991, indicating economic diversification post-globalization. Women engage more in farm work but have limited land ownership. Key strategies include improving women's access to land, credit, technology, education, and leadership for sustainable development. Biswas (2018) examines women's work participation in West Bengal, highlighting gender disparities, rural-urban differences, and the dominance of women in low-paying agricultural jobs with poor working conditions. Ray and Debnath (2018) They examines regional disparities in rural female work participation in West Bengal using secondary data. Women participate more where male participation is lower, especially in the Eastern Plateau, Red Lateritic, and Eastern Himalayan regions. In the Lower Gangetic region, higher economic and agricultural productivity attract more male workers. Gender disparity is notably high in the southern Lower Gangetic region and Nadia district, highlighting the link between gender gap and disparity. Shaw (2018) examined Female labour force participation in agriculture varied across West Bengal districts (1991–2011), ranging from 1% to 15%. It was highest in Purulia, followed by Paschim Medinipur, Bankura, and Dakhin Dinajpur, and lowest in Howrah. Key influencing factors include female literacy, foodgrain area, child population, SC/ST female population, and urbanization. Participation increased significantly across districts. The present study aims to analyze the female work participation rate in agriculture across all districts of West Bengal. It also examines the district-wise female participation rate in agriculture, along with the population of cultivators and agricultural labour.

2. METHODS AND MATERIALS

Background of the research

To accomplish the present research work data, secondary data sets are available in the Census of India 2011 report or other official sources for the precise ranking of West Bengal regarding Women's participation rate in agriculture during that period. According to the census (2011), West Bengal held a notable high rank in terms of women's involvement in agricultural activities compared to other states in India. The data revealed a substantial proportion of women in West Bengal engaged in various agricultural tasks, including cultivation, livestock rearing, and related activities.

Work participation rate Chatterjee and Ghosh (2012) defined work participation rate as the ratio of the economically active agricultural population (EAAP) and the Total economically active population (TEAP), which can be expressed as,

$$WPR = (EAAP / TEAP) * 100$$

Subsequently, the following definitions are framed as follows:

WPR(M) is defined as the economically active Male work participation rate in agriculture to the total economically active population i.e.,

$$WPR\ (M) = (EAMAP / TEAP) * 100$$

Where EAMAP is an economically active agricultural male population

WPR(F) is defined as the economically active Female work participation rate in agriculture to the total economically active population i.e.,

$$WPR\ (F) = (EAFAP / TEAP) * 100$$

Where EAFAP is an economically active agricultural Female population

Cultivator (M) (% of male cultivator in respect of total Ag Population) =

$$\frac{Cultivator\ male}{Total\ Ag\ Population} \times 100$$

Cultivator (F) (% of female cultivator in respect of total Ag Population=

$$\frac{Cultivator\ female}{Total\ Ag\ Population} \times 100$$

Ag. Labour(M) (% of male agricultural labour in respect of total Ag Population) =

$$\frac{Ag\ Labour\ male}{Total\ Ag\ Population} \times 100$$

Ag. Labour(F) (% of female agricultural labour in respect of total Ag Population) =

$$\frac{Ag\ Labour\ female}{Total\ Ag\ Population} \times 100$$

Cultivator (M/M) (% of male cultivator in respect of male Ag Population) =

$$\frac{Cultivator\ male}{male\ Ag\ Population} \times 100$$

Cultivator (F/F) (% of female cultivator in respect of female Ag Population) =

$$\frac{Cultivator\ female}{female\ Ag\ Population} \times 100$$

Ag. Labour (M/M) (% of M agricultural labour in respect of male Ag Population) =

$$\frac{Ag\ Labour\ male}{male\ Ag\ Population} \times 100$$

Ag. Labour (F/F) (% of F agricultural labour in respect of female Ag Population) =

$$\frac{Ag\ Labour\ female}{female\ Ag\ Population} \times 10$$

Source of the data

The study concentrated on West Bengal and its associated districts. Secondary data sources were utilized to meet the research requirements. Data relevant to the designated objective were gathered from the population data set's economic classification covering the West Bengal districts. Spanning from 1961 – 2011, sourced from the statistical abstract of the Government of West Bengal and the census of India.

The analysis indicates that female participation in agricultural work is substantial, yet their roles remain largely informal and unpaid. Women are primarily engaged in labor-intensive tasks such as transplanting and harvesting, while men dominate mechanized and higher-income agricultural activities. Additionally, socio-cultural norms and traditional land inheritance laws restrict women's ownership of agricultural land, limiting their decision-making power in farming-related matters.

3. RESULT AND DISCUSSION

3.1: Work Participation Rate in Agriculture for the districts of West Bengal

The study examines the gender gap and the evolving nature of women's participation in agriculture, with a focus on West Bengal. It systematically compiles data from the 1960s onward to address critical gaps in the literature on female labor participation. The research underscores the importance of analyzing women's agricultural work within a broader socioeconomic framework, highlighting the dynamic nature of their roles as the demand for female labor grows. Women's participation in agricultural activities, whether as family labor or hired workers, varies significantly based on economic conditions, social hierarchies, and cultural norms. Despite their substantial contributions, Indian policies fail to formally recognize women as farmers, perpetuating gender-based disparities. These women, whose labor often begins before dawn and extends

late into the night, remain unheard due to deeply ingrained societal norms rooted in gender socialization. Their agricultural efforts are carried out alongside responsibilities as wives, daughters-in-law, and mothers, all within the constraints imposed by social and cultural systems.

The Work Participation Rate (WPR) in agriculture rose steadily after independence, peaking around the 1981 Census, but began declining thereafter, reflecting improved economic conditions and alternative income opportunities, particularly in the wake of globalization. Female Work Participation Rates (FWPR), while consistently lower than male rates across West Bengal, show notable regional variations. Districts like Purulia, Darjeeling, Burdwan, and Hooghly reported relatively higher FWPRs in agriculture, with Purulia experiencing a significant increase by 2001 after a slight decline in the preceding decade. In contrast, districts such as Murshidabad, Nadia, 24-Parganas, and Howrah consistently recorded lower FWPRs. Although the reliance on secondary data limits the study's ability to capture finer regional nuances, the findings offer valuable insights into the multifaceted dynamics of women's participation in agriculture.

A detailed analysis of the Work Participation Rate (WPR) in agriculture, with an emphasis on gender dynamics, has been thoroughly examined for all districts of West Bengal and the state as a whole. The results are organized into the table below and also depicted in graphical format.

Table 1: Total WPR (WORK PARTICIPATION RATE) in agriculture rank table

District	WPR 1961	Rank	WPR 1971	Rank	WPR 1981	Rank	WPR 1991	Rank	WPR 2001	Rank	WPR 2011	Rank
Darjeeling	40.40	**14**	39.59	**14**	34.07	**14**	48.10	**14**	38.37	12	20.80	**14**
Jalpaiguri	46.34	**12**	50.01	**13**	46.86	**12**	48.61	**13**	66.95	**3**	37.31	12
Cooch Behar	81.21	**3**	83.54	**1**	77.10	**1**	75.31	**2**	68.22	**1**	67.08	**1**
Dinajpur	87.85	**1**	66.06	8	75.91	**2**	80.76	**1**	51.55	7	66.18	**2**
Malda	51.56	10	79.52	**4**	66.87	**5**	66.55	7	46.73	8	52.08	7
Murshidabad	63.91	8	75.58	7	64.89	7	63.74	11	60.07	6	47.23	8
Birbhum	74.2	6	79.29	**5**	70.34	**3**	70.31	**4**	44.70	9	62.98	**4**
Barddhaman	46.18	**13**	54.80	11	49.58	11	69.78	**5**	43.07	10	45.18	10
Nadia	59.61	9	65.30	9	58.43	9	68.73	6	23.68	**14**	46.93	9
24 Pargana	49.06	11	51.97	12	42.01	**13**	64.29	10	39.25	11	24.83	**13**
Hooghly	68.66	7	54.97	10	49.92	10	64.39	9	66.08	**4**	39.15	11
Bankura	77.04	**5**	81.36	**2**	67.04	**4**	72.25	**3**	67.31	**2**	65.27	**3**
Purulia	83.57	**2**	78.62	6	61.10	8	64.73	8	64.45	**5**	60.89	**5**
Howrah	23.80	**15**	32.51	**15**	10.13	**15**	46.72	**15**	15.38	**15**	14.40	**15**
Medinipur	80.56	**4**	80.41	**3**	66.86	6	62.05	12	25.73	**13**	60.84	6

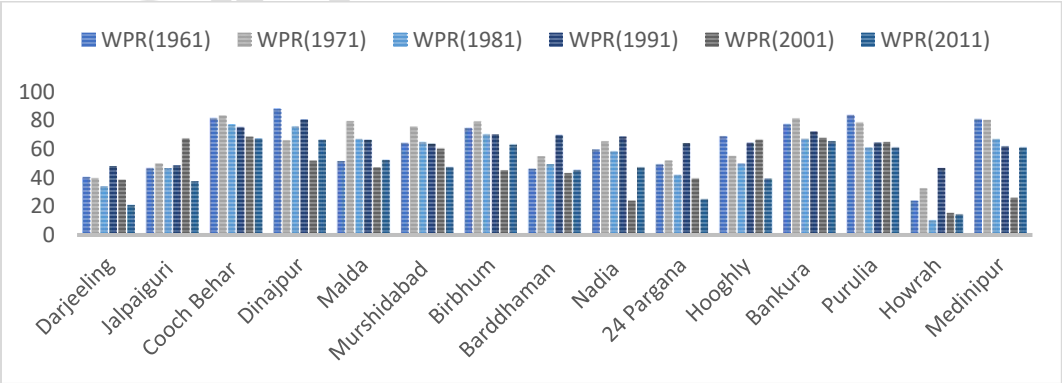

Fig: 1 Graphical representation of total Work Participation Rate (WPR) in agriculture

Table 2: WPR (Work Participation Rate) Male rank table

District	WPR (1961)	Rank	WPR (1971)	Rank	WPR (1981)	Rank	WPR (1991)	Rank	WPR (2001)	Rank	WPR (2011)	Rank
Darjeeling	24.49	**14**	28.11	**15**	24.31	**14**	33.42	**15**	16.48	**14**	13.90	**14**
Jalpaiguri	39.00	**12**	48.29	12	43.62	10	43.02	**14**	25.58	12	26.65	12
Cooch Behar	77.57	**2**	81.9	**1**	74.15	**1**	68.79	**2**	46.30	**3**	49.66	**2**
Dinajpur	80.22	**1**	62.35	9	69.55	**2**	69.05	**1**	47.42	**2**	48.84	**3**
Malda	38.47	**13**	75.48	**2**	61.63	**5**	57.34	8	38.47	8	41.32	8
Murshidabad	61.23	**5**	73.66	**3**	63.52	**4**	61.99	**4**	43.66	**5**	44.15	6
Birbhum	64.44	**4**	72.99	**4**	63.64	**3**	61.03	6	45.37	**4**	50.43	**1**
Barddhaman	40.06	11	48.64	**13**	42.87	12	58.72	7	33.88	10	35.02	10
Nadia	58.27	7	63.79	8	56.86	7	66.58	**3**	39.11	7	43.98	7
24 Pargana	47.69	10	50.99	10	40.93	**13**	61.39	**5**	20.98	**13**	21.72	**13**
Hooghly	59.75	6	48.91	11	43.10	11	54.93	10	29.54	11	30.45	11
Bankura	57.18	8	69.07	6	53.61	8	55.10	9	41.48	6	45.15	**4**
Purulia	47.71	9	65.54	7	45.58	9	43.17	**13**	35.86	9	35.47	9
Howrah	23.38	**15**	32.12	**14**	9.47	**15**	45.34	12	13.92	**15**	12.73	**15**
Medinipur	67.41	**3**	72.82	**5**	58.44	6	51.93	11	48.53	**1**	45.11	**5**

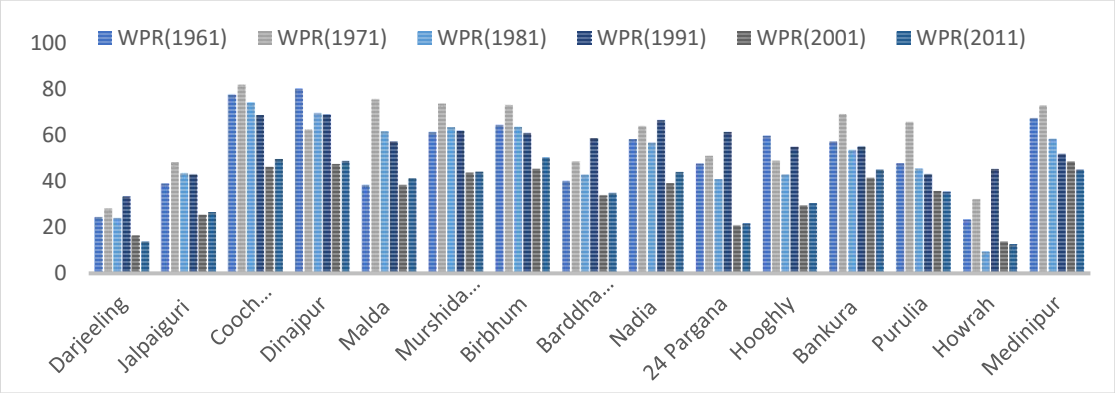

Fig: 2 Graphical representation of Male Work Participation Rate (WPR) in agriculture

Table 3: WPR (Work Participation Rate) Female rank table

District	WPR (1961)	Rank	WPR (1971)	Rank	WPR (1981)	Rank	WPR (1991)	Rank	WPR (2001)	Rank	WPR (2011)	Rank
Darjeeling	15.90	**3**	11.49	**3**	9.77	**3**	14.68	**3**	9.25	11	6.90	11
Jalpaiguri	7.34	9	1.72	11	3.24	10	5.60	11	12.79	7	10.67	8
Cooch Behar	3.64	11	1.64	12	2.84	11	6.53	10	20.66	**4**	17.42	**3**
Dinajpur	7.63	8	3.71	9	6.36	8	11.72	**4**	20.81	**3**	17.34	**4**
Malda	13.08	**5**	4.04	8	5.24	9	9.21	9	13.08	6	10.76	7
Murshidabad	2.68	12	1.91	10	1.38	**13**	1.76	**14**	3.07	**13**	3.09	**13**
Birbhum	9.85	6	6.30	**5**	6.71	7	9.28	8	14.70	**5**	12.56	6
Barddhaman	6.12	10	6.16	6	6.72	6	11.07	**5**	10.82	9	10.16	9
Nadia	1.34	**14**	1.51	**13**	1.57	12	2.15	**13**	3.96	12	2.96	**14**
24 Pargana	1.36	**13**	0.98	**14**	1.08	**14**	2.91	12	2.71	**14**	3.11	12
Hooghly	8.90	7	6.07	7	6.82	**5**	9.47	7	9.72	10	8.71	10
Bankura	19.87	**2**	12.29	**2**	13.43	**2**	17.15	**2**	24.60	**2**	20.12	**2**
Purulia	35.87	**1**	13.08	**1**	15.52	**1**	21.57	**1**	31.45	**1**	25.43	**1**

Howrah	0.42	**15**	0.39	**15**	0.67	**15**	1.39	**15**	1.47	**15**	1.68	**15**
Medinipur	13.16	**4**	7.59	**4**	8.42	**4**	10.13	6	12.57	8	15.73	**5**

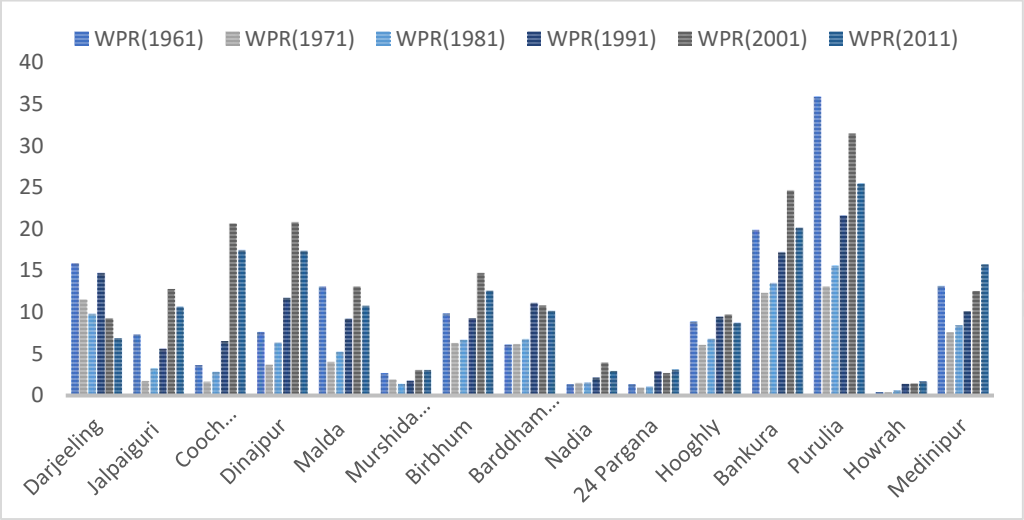

Fig: 3 Graphical representation of Female Work Participation Rate (WPR) in agriculture

3.2. Population of cultivators and agricultural labours:

Women in West Bengal play a significant role in the agricultural labour force, yet their access to land is severely restricted, and their representation as cultivators remains minimal. Over the last six decades, the proportion of female cultivators has consistently been negligible across all districts, with only a slight improvement in Darjeeling. Participation rates of female agricultural laborers are particularly low in urban areas such as Howrah, 24 Parganas, and Nadia, while relatively higher figures are observed in districts like Purulia, Hooghly, Bardhaman, Bankura, and Birbhum. In North Bengal, districts like Darjeeling, Jalpaiguri, and Cooch Behar report some of the lowest participation rates, with slight increases seen in Dinajpur. Although women constitute a substantial share of the agricultural workforce within their gender group, they are predominantly engaged as unskilled, daily-wage laborers rather than landowners or cultivators.

A comparative analysis of cultivators and agricultural laborers, disaggregated by gender, is presented through the bar graphs and tables below. Additionally, an effort has been made to compare the participation rates of male and female cultivators and agricultural laborers, both in relation to the total agricultural population and within their respective gender-specific agricultural populations.

Table 4: Table for Population of cultivators and agricultural labours for West Bengal

Year	Cultivator (M)	Cultivator (F)	Ag Labour (M)	Ag Labour (F)	Cultivator (M/M)	Cultivator (F/F)	Ag Labour (M/M)	Ag Labour (F/F)
1961	37.50	9.11	23.18	5.21	61.81	23.26	38.19	36.39
1971	53.92	1.57	38.73	5.77	58.19	21.41	41.81	78.59
1981	51.37	2.66	38.86	7.10	56.94	27.25	43.06	72.75
1991	50.17	3.91	36.87	9.04	57.64	30.21	42.36	69.79
2001	35.76	7.67	39.03	17.54	47.82	30.44	52.18	69.56
2011	29.40	4.03	48.69	17.88	37.65	18.39	62.35	81.61

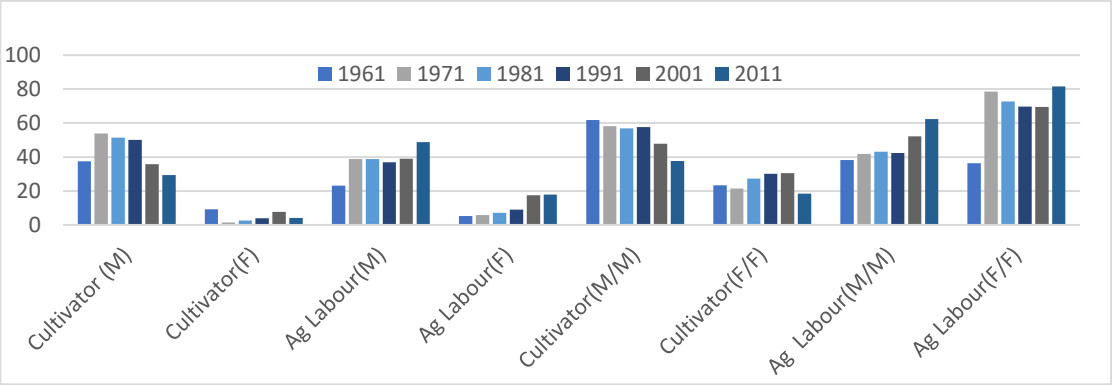

Fig: 4.: Population of cultivators and agricultural labour

CONCLUSION

This research analyzed gendered work participation in agriculture across West Bengal, spanning data from the 1960s to 2011. The analysis revealed a persistent gender disparity, with male participation rates consistently exceeding female rates. However, female work participation showed significant regional differences, with districts like Purulia, Hooghly, Bardhaman, and Bankura exhibiting relatively higher rates, while urbanized areas such as Howrah, Nadia, and 24-Parganas demonstrated consistently lower engagement. Over time, the overall Work Participation Rate (WPR) in agriculture peaked in the 1980s but subsequently declined, reflecting broader economic shifts and the diversification of income opportunities.
Women's involvement in agriculture, often as unpaid family labor or low-wage workers, plays a critical yet undervalued role. Despite their substantial contributions, they remain excluded from formal recognition as farmers, largely due to cultural and structural barriers that restrict their access to land and decision-making roles. These systemic challenges highlight the necessity for policy reforms that acknowledge and support women's agricultural labor, enabling equitable opportunities and recognition.
Further research should aim to capture region-specific details through primary data collection and evaluate the impact of targeted policy measures aimed at empowering women in agriculture. Addressing these disparities is vital for fostering gender equity and sustainable agricultural development.

DISCLAMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declares that NO generative AI technologies such as large Language Models (ChatGPT, COPILOT, etc) and text-to-image generation have been used during writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCE

Bhattacharyya, B., & Ghosh, M. (2009). Participation anlysis of South Asian rural women towards sustainable development in agriculture. *Journal of Crop and Weed,* 5(1), 61-66.

Bhattacharyya, B., & Bhattacharyya, U. (2017). Inequality, Poverty and Development in India, India Studies in Business and Economics (pp. 513 – 518). Springer Nature Singapore Pte Ltd. DOI 10.1007/978-981-10-6274-2_26

Bhattacharyya, B., & Ghosh, M. (2012). Statistical analysis of Indian agricultural workforce, A study on gender perspective. Publisher: LAP Lambert Academic Publishing, Germany.

Biswas, s. (2018) Work participation rate of women in West Bengal. International Journal of Research in Humanities, Arts and Literature, 6(8), 423-434.

Census of India. (1961, 1971, 1981, 1991, 2001, 2011). Retrieved from: http://censusindia.gov.in/.

Chakraborty, I., and Chakraborty, A. Female work participation and gender differential in earning in West Bengal, *Indian Journal of Quantitative Economics*, 8(2), 98-114.

Chatterjee, B. and Ghosh, D.K., 2001. *In search of a district development index*. State Institute of Panchayats and Rural Development, West Bengal.

Ray, S. & Debnath, M. (2018). Disparity of Female Work Participation in Agricultural Regions of West Bengal. *Indian Journal of Social Research,* 5(3), 5-27.

Shaw, s. (2018). Female Participation in Agriculture of West Bengal: A District Level and Micro Level Analysis. *International Journal of Research and Analytical Reviews*, 5(3), 1937-1944.

Singariya, M.R., and Shekhawat, H. (2015). Determinants of female work participation in Rajasthan: A District level analysis. 35th REA Annual Conference, Jaipur.