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Assessment of Regional Inequality in Female Work Participation: Measurement of Disparity and Determinants



Sheuli Ray*, Manoj Debnath

Department of Geography, School of Human and Environmental Sciences, North Eastern Hill University, Shillong-793022, Meghalaya, India.

Abstract

The regional difference of complex Indian social structure and customs have a different impact on the nature of women's work participation. The present study aims at unravelling the influence of social, cultural and economic forces in differentiating the level of women work participation in different eco-regions of West Bengal. The study is based purely on secondary sources and data have been collected from the Census of India. It is in the rural areas that the female work participation is directly linked to agriculture and allied activities and the study confines itself to an understanding of work participation of women only in the rural areas. The modern technological implication as a result of green revolution has a worse impact on women work participation particularly in the South Bengal plain and some parts of East Rarh Plain region. The high gender gap is noticed in *Nadia* district located in the middle part of South Bengal Plain causes very high withdrawn of female from there. Effect of socioeconomic variables, work participation of Scheduled component in main economic activity is also varied from the non-scheduled component. Non-scheduled worker participated more in non-agricultural sector rather than the scheduled counter parts. Subsequently, the low growth rate of female work participation represents a distress picture in work force structure which is a cause of worried also.

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1 INTRODUCTION

There is a little attention to the problem of female unemployment in India which is highly observed particularly in rural India (Gulati, 1976). Female work participation in economic activity is a vital issue since last five decades. Because they participate in most of the household work and other out-door activities but their decision is controlled by men. Female's position in the society is determined by several socioeconomic, regional and demographic constraints which have different impact on both sexes. Dev (2004) argued that technological changes and demographic factors are important determinants of female participation in economic activity. Female work participation in

different sectors compare to men is an important benchmark for their status as well as empowerment in society. As a part of East India, West Bengal is not separate from this real situation of female work participation in economic activity. Verma and Bano (1998) classified the explanatory variables for FWPR into four classes; buffer factor, segregation factor, substitution factor and income factor. Vlasblom and schippers (2006) discussed that, shortning the period of working hours or fully leave from the labour market which is directly influenced by the household members. Labour supply is primarily determined by economic, social, and demographic constraints of labour supplying household (Bardhan, 1979). Singh and Mishra (2013) argued that the participation of women in work and

* Author address for correspondence

Department of Geography, School of Human and Environmental Sciences, North Eastern Hill University, Shillong-793022, Meghalaya, India.
Tel.: +91 9775849128

E-mail: sheuliraynehu@gmail.com (S. Ray -Corresponding author); manojdebnathfg@gmail.com (M. Debnath)

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conquest remuneration is considered by socio-cultural context. Women participation in economic activity speaks about condition of women about caste and class disparity and gender biasness in the society. According to Gulati (1975), the nature of crop grown has a direct relation with female participation rates in rural area i.e. in rice cultivation area, women worker are found much and in wheat cultivation area male worker are much due to masculine skills. Nayyer (1987) identified that, in the areas where income had gone up due to green revolution, women intended to withdraw from the labour market due to the improved income effect of their family. Dutta and Mishra (2011) noted that, due to migration of men in rural household, women became head of the family. Due to their men's migration and even there is a traditional narrow understandings of women's work led to constraints on women's ability to do on the farms (Arun, 2001). Female get work opportunities in rice transplantation and weeding may be wholly or partly offset by other factors of equal significance such as smaller size of average holding and technological stagnation in rice growing areas (Sinha, 1975). The persistent gender division of labour in rural Bangladesh has been found to be associated with both economic factors and socio-cultural factors (Hossain *et al.* 2004). Srivastava and Srivastava (2010) examined that education may not positively influence a woman's participation in work, but women who are engaged in the workforce; education enables them to move into non-agricultural jobs for enhancing their status by poverty reduction. Sinha (2005) discussed the micro level analysis of FWPR in West Bengal by using the census data from 1961 to 2001 where FWPR is relatively in very low position. Ghosh (2001) observed that due to existence of biasness of male and female WPR, the first generation of tribal women workers i. e non-Bengalee migrated female from the adjoining states have led to join in the traditional industries like rice meal industry. But, 2nd generation of female work participation in the informal sectors has shown as inter-district wise and most of them coming from lower caste group. Saha and Bahal (2010) observed that, there was a high involvement of farmer's household in different non-farm income sources. Chakraborty and Chakraborty (2010) argued that in developing countries the relationship between female work participation and education level shows a U-shape pattern and West Bengal is no different from this general pattern. Jain and Chand (1982) observed in West Bengal, 20 out of 104 females were reported themselves as non-workers but they were seen to be working in different activities such as winnowing, threshing and parboiling and working as domestic servants in the homes of others for as many as 8-10 hours per day. Sinha (1975) noted that, in West Bengal, it was clearly illustrated how social prejudice against female work and relatively higher level of development contributed to a consistent trend of low participation rates from 1901 to 1971 using district wise statistics.

This study explores the factors which affect the inter-regional variations (%) of female workers in rural areas and analyse the reasons of variations in the inter-regional dimension, agricultural and non-agricultural occupational category. The supply of labour force is mainly affected by the size and composition of population. The present study attempts to examine the sources of inter-state differentials in work force participation rates. The inter-regional variations in the work participation rates are explained in terms of two factors, work force tendencies reflected in socio-economic factors and age-structure and sex-composition of the population. Further, the male-female labour participations for different age-groups seem to be negatively related with the levels of economic development. Usually, female in rural areas perform multiple duties by combining all types of household work including child-care with such other jobs as farming, animal husbandry, work in household industry, etc, depending upon the opportunities offered by the complex social, economic and organisational structure of rural life. This study also has been analysed the level of disparity and gender gap in work participation rate. Different statistical measure is done to present inequality in work participation rate in different social strata of the society.

2 METHODOLOGY

The study is based on the data which are collected from different sources such as Census of India, National Sample Survey Reports, District Census Hand Books, Statistical Abstract of Govt. of West Bengal. The demographic data needed for the present study of rural female workforce of West Bengal have been obtained from different census publications of the state. In adopting the methodology, it is keeping in mind that population geography deals with the spatial aspect of population in the context of nature of place; the entire state is divided into some physical regions. These are Hill and Tarai, Western Rarh and Plateau, East Rarh Plain, North Bengal Plain, South Bengal Plain. Census data (B3, Economic Table) is used to show the meso pattern in the variation of female participation in economic activity in West Bengal. Female participation in economic activity is measured in two ways,

To explore the disparity in female work participation, Modified Shopher's Disparity Index is used.

Where, *Sopher's* Disparity Index (1974):

$$Ds = \text{Log} (X2 / X1) + \text{Log} (100 - X1) / (100 - X2)$$

Modified Sopher's Disparity Index by Kundu and Rao (1983):

$$Ds = \text{Log} (X2 / X1) + \text{Log} (200 - X1) / (200 - X2)$$

Whereas, $X2 \geq X1$; $X2$ and $X1$ are work participation rate of alphas and non-alphas, respectively.

To pursue inequality in work participation, Gini coefficient is calculated and Lorenz curve is prepared.

$$\text{Gini Coefficient (G)} = (1 - \sum x_i \times y_i + 1 - \sum x_i + 1 \times y_i) / 2 \text{ (Reduced to scale)}$$

Karl Pearson's correlation matrix is also used here to measure inter relationship between different variables that determine female work participation.

3 RESULTS AND DISCUSSIONS

Women play a distinctive role in rural economic activities in a predominantly agricultural country like India as well as in West Bengal but till their work is not acknowledged. Census information is used here to explore the pattern and disparity in female work participation with social and spatial coverage in rural areas of West Bengal using district level data. Due to complex social fabric of West Bengal, women have to confine in the indoor activity. Physical region is a way of understanding the inter-regional disparity of rural female work participation in economic activity in different social strata of the society in West Bengal. They have to face distinctive constrained by rigid socio-economic realities and generate gender inequalities. There is a marked difference in all the strata of the society according to ecologic zones in West Bengal. The study also highlights the several demographic, socioeconomic and agricultural variables which have different impact on both the sexes in different regional dimension in West Bengal. Higher the level of education can alter female to move out from the agricultural sector to the non-agricultural activity. Educated women in rural India moved outside the family more due to the increase demand for female labor force in non-agricultural sectors (Banerjee and Raju, 2009). Mitra and Singh (2006) considered education as the main human capital which leads the development in economy. Work participation of Muslim women is largely constrained by the socio-cultural system rooted in the religious prejudices (Mistry, 2005).

3.1 Disparity in Work Participation

The increased demand for professional services and the expansion of higher educational opportunities among the youth female increased the structural growth and economic development of a country Cooney (1975). The study reveals that highest disparity is noticed in South Bengal Plain (0.97) followed by East *Rarh* Plain (0.87) and lowest disparity is observed in Hill and *Terai* (0.62). In West Bengal total disparity is 0.82. Male work participation is high in NBP. As North Bengal Plain is more fertile and good for agricultural production male participated more in agricultural activity as main worker and exclude female from there which is responsible to produce more disparity in work participation rate (Ray and Debnath, 2018). As Hill and *Terai* region is not suitable for agricultural practices and physiography is more hurdle to do work, both male and female participated in main working activity more than the others region. Same situation is also noticed in West

Rarh and Plateau Fringe region. In West Bengal average gender gap in total work participation is 35.89 percent (Table 1). In inter-regional context highest gender gap is noticed in South Bengal Plain followed by East *Rarh* Plain and lowest gender gap is noticed in West *Rarh* and Plateau Fringe region. Inter-district disparity shows highest disparity in Nadia district (1.0) and Gender gap is also very high. Darjiling district has shown minimum disparity and gender gap in total main work participation. All the districts from South Bengal Plain and East *Rarh* Plain shows high disparity (Above 0.79) in total work participation rate. Southern part of West *Rarh* Plateau Fringe region and Koch Bihar district from Hill and *Terai* Regions also come under this high category. There is a noticed high disparity in middle and eastern South Bengal region. Because high concentration of economic and agricultural development is moved in a faster rate and male from the others region also come here to participate in main economic activities and high disparity is generated. Medium disparity (0.64-0.79) is noticed in the middle portion of West *Rarh* Plateau Fringe and in the North Bengal Plain. Low level of disparity is found in Northern part of Hill and *Terai* region i.e Darjiling and Jalpaiguri districts and North Western part of West *Rarh* and Plateau Fringe Region i.e Puruliya district.

Disparity is inferiority of uniformness in spatial extent (Table 2). Highest disparity is noticed in South Bengal Plain (0.92) followed by East *Rarh* Plain (0.75). Because this region is more developed in West Bengal and attract male to participate not only in agricultural sector but others informal sectors also results into more disparity. Lowest disparity is noticed in West *Rarh* and Plateau Fringe (0.63). Gender gap in work participation rate is also high in South Bengal Plain (40.42 percent) followed by Hill and *Terai* (37.41 percent) and lowest in West *Rarh* and Plateau Fringe (22.20 percent). It is very interesting, that in Darjiling Scheduled Caste population concentration is low than the others category and minimum number of women from this category is participated in main work participation than the male and causes medium to high gender gap. Inter-district pattern shows that highest disparity is noticed in Nadia followed by 24 Parganas from South Bengal Plain and Lowest is in Bankura district (0.54). On the other hand highest gender gap is noticed in Nadia and lowest in Puruliya district from two different region due to socio-cultural and physiographic variation in regional tract. High disparity (above 0.75) has shown in all the districts of South Bengal Plain, northern and southern part of East *Rarh* Plain, and Jalpaiguri and Koch Bihar district of Hill and *Terai* Region. High disparity index form a concentric arc in Southern West Bengal where it starts from Birbhum and lasts upto Haora in East *Rarh* Plain. As maximum number of Scheduled Caste people live in Koch Bihar district and also in 24 Parganas, Nadia and in others part work participation of male is higher than the female and disparity is noticed. Medium disparity (0.62- 0.75) is noticed in central part of East *Rarh* Plain, north western and southern part of West *Rarh* Plateau

Fringe i.e in Puruliya and Medinipur district, Darjiling from northern part of Hill and *Terai* region and in both the districts of North Bengal Plain. Lowest disparity (Below 0.62) is observed only in Bankura, located in central part of West *Rarh* Plateau Fringe region. As this is a extended part of dissected Plateau and Bad lands types of relief also noticed, agricultural practices is not good enough and industrially not developed causes more participation of female with male to meet their basic livelihood and results lowest disparity in main work participation rate.

The study found that in West Bengal average disparity is 0.40 and gender gap is 19.36 according to 2011 census which is comparatively lower than the Scheduled Caste and Non Scheduled workers (Table 3). Inter-district disparity shows highest disparity in 24 Parganas (0.64) followed by Koch Bihar district (0.62) and lowest in Hugli district (0.22). But highest gender gap is noticed in Nadia districts (30.62%) and

Table 1. Disparity and gender gap in total main work participation rate in Bengal, 2011

Physiographic regions	Districts	Disparity index		Gender gap (%)	
		Inter district	Inter regional	Inter district	Inter regional
Hills and <i>Terai</i>	Darjeeling	0.43	0.62	22.49	31.77
	Jalpaiguri	0.61		31.14	
	Koch Bihar	0.82		41.68	
North Bengal Plain	W. Dinajpur	0.74	0.72	35.66	33.32
	Maldah	0.70		30.98	
South Bengal Plain	Murshidabad	0.88	0.97	37.98	40.77
	Nadia	1.00		46.59	
	24 parganas	0.96		37.73	
East <i>Rarh</i> Plain	Birbhum	0.88	0.87	36.02	39.58
	Barddhaman	0.80		37.86	
	Hugli	0.87		42.15	
	Haora	0.97		42.29	
West <i>Rarh</i> Plateau Fringe	Bankura	0.76	0.74	32.19	29.13
	Puruliya	0.63		23.14	
	Medinipur	0.82		32.06	
West Bengal		0.82		35.89	

Table 2. Disparity and gender gap in SC main work participation rate in Bengal, 2011

Physiographic regions	Districts	Disparity index		Gender gap	
		Inter district	Inter regional	Inter district	Inter regional
Hills and <i>Terai</i>	Darjeeling	0.63	0.73	32.66	37.41
	Jalpaiguri	0.79		38.21	
	Koch Bihar	0.79		41.35	
North Bengal Plain	W. Dinajpur	0.71	0.69	36.75	34.18
	Maldah	0.66		31.61	
South Bengal Plain	Murshidabad	0.85	0.92	38.85	40.42
	Nadia	0.99		45.36	
	24 parganas	0.91		37.04	
East <i>Rarh</i> Plain	Birbhum	0.77	0.75	33.45	35.26
	Barddhaman	0.64		32.02	
	Hugli	0.69		34.96	
	Haora	0.90		40.62	
West <i>Rarh</i> Plateau Fringe	Bankura	0.54	0.63	25.80	25.20
	Puruliya	0.64		21.52	
	Medinipur	0.72		28.28	
West Bengal		0.76		35.05	

lowest in Jalpaiguri district (15.25%) because in Jalpaiguri district, most of the tribal people work in tea gardens. Many of the village women participated in other working activity more than six months as daily wage labor. It decreases the gender gap in work participation rate. Inter-regional disparity shows highest disparity in South Bengal Plain (0.50) followed by North Bengal Plain (0.49). This plain area work as pulling attraction place to people specially male to participate in agricultural sector as cultivator or agricultural labour. Not only that Scheduled Tribe male also participated in different industrial sectors results highest disparity in Scheduled Tribe work participation rate. Lowest disparity is noticed in East *Rarh* plain (0.28). Disparity and gender gap is also low in Hill and *Terai* region. As East *Rarh* Plain is a region formed by red soil, agricultural diversification is not spread enough and industrially this area is not much developed creates more barrier to male to meet basic needs of his family and that's why female also participated with male in economic activity to reduce gender gap and disparity in that region. Hill and *Terai* region also have physical barrier which motivate female to participate in working activities with men. Not only that, so many female participated in tea industry to collect tea leaves and many of them are from forest villages and participated in economic activity as wage labour. High level of disparity (0.40) is noticed in middle and southern part of South Bengal Plain i.e in Nadia and 24 parganas district, north-western and middle part of West *Rarh* Plateau Fringe region, southern part of Hill and *Terai* region and in both the districts of North Bengal Plain. Medium disparity (0.27-0.40) is observed in northern and southern part of East *Rarh* Plain, southern part of West *Rarh* and Plateau Fringe region i.e in Medinipur,

northern part of South Bengal Plain and in the middle part of Hill and *Terai* region i.e in Jalpaiguri district. Low level of disparity is noticed in middle portion of East *Rarh* Plain and in the northern part of Hill and *Terai* region i.e. in Darjeeling district. The study shows that category wise disparity is not observed in one specific region but dispersed in different parts of this five diversified physiographic regions due to socio-cultural variation, concentration of Scheduled Tribe male and female population and some other demographic factors.

3.2 Measure of Inequality

Out of the several methods used for measuring disparities, Lorenz Curve and Gini Coefficient is used widely to represent the extent of in-equalities. Lorenz curve is a distribution curve associated with the Gini ratio. This curve shows the degree of departure from the line of equal distribution. The area shown between the actual curve and equal distribution line is the value of Gini coefficient. Gini coefficient is also measures to which extent there are variations in the observation. If the calculated value is zero it will show no variation. Higher the value of Gini indicates higher the extent of variation in the observed values of the series. Female total work participation portrays that Gini value is highest in Non-Scheduled component and lowest in Scheduled Tribe category. Its mean total work participation of female is greatly varies from lower strata to upper layer of the society i.e Scheduled Tribe female participated more than the Scheduled Caste and Non-Scheduled female in total female work participation. Its mean female work participation is continuously growing from upper strata to lower strata. Ghosh (2001) argued that it cannot be denied that sex-

Table 3. Disparity and gender gap in ST main work participation rate in Bengal, 2011

Physiographic Regions	Districts	Disparity Index		Gender Gap	
		Inter District	Inter Regional	Inter District	Inter Regional
Hills and <i>Terai</i>	Darjeeling	0.24	0.38	15.34	21.34
	Jalpaiguri	0.28		15.25	
	Koch Bihar	0.62		33.43	
North Bengal Plain	W. Dinajpur	0.41	0.49	25.51	26.87
	Maldah	0.57		28.23	
South Bengal Plain	Murshidabad	0.38	0.50	23.17	27.51
	Nadia	0.49		30.62	
	24 parganas	0.64		28.74	
East <i>Rarh</i> Plain	Birbhum	0.37	0.28	20.27	17.78
	Bardhaman	0.23		14.26	
	Hugli	0.22		14.51	
	Haora	0.32		22.09	
West <i>Rarh</i> Plateau Fringe	Bankura	0.42	0.43	18.06	18.00
	Puruliya	0.49		18.57	
	Medinipur	0.37		17.36	
West Bengal		0.40		19.36	

segregation and women's economic marginalization is primarily a reflection of the overall societal economic inequality. Although in Scheduled Tribe category maximum number of female participated as marginal worker and non-scheduled class female participated more in main working activity as their level of education, living standard and family income is more than the scheduled component especially scheduled tribe female. Not only that, non-scheduled class female participation is also determined by different social system, taboos, religion in different regional extent that reduce total work participation rate and increase main work participation.

After a detail analysis of the aforesaid parameters on work participation rate of each physiographic regions have been worked out to perceive the actual situation of female work participation in relation to regional context. It would enable to identify the gaps in composite work participation at the inter regional level in West Bengal. The composite index of male main work participation in regional perspective portrays in table 4. South Bengal Plain (0.62) shows highest composite value in male work participation rate followed by East *Rarh* Plain (0.61). This two regions actually located in opposite sides of the river Ganges where multi-level developments are going on very rapidly, giving more opportunity in main working sectors. Male participated more than the female in these two regions. North Bengal Plain (0.53) shows medium composite value in male work participation. Actually this region is a part of the upper Gangetic Plain and here female work participation in marginal working activity is more than the main activity. Lowest composite value has seen in Hill and *Terai* region (0.43) followed by West *Rarh* Plateau

Fringe region (0.48). These two region experienced worst situation in male main work participation because physiographically and agriculturally these two regions are not suitable for getting good opportunity in main working activities. Male have to migrate in others region in search of work and this results into low composite value in total Male main work participation in West *Rarh* Plateau Fringe region.

So far composite value of female main work participation is highest in Hill and *Terai* region i.e 0.65 which is showing best position in providing good female work participation rate (Table 5). As maximum number of female participated in Tea industries in Darjiling and Jalpaiguri districts and so many female in Koch Bihar, participated in different House hold industries like Bidi rolling due to huge number of tobacco production in this district and some small hand loom cottage industries which results into highest composite value in female main work participation in Hill and *Terai* Region. It is followed by NBP (0.50) and West *Rarh* Plateau Fringe region (0.47). If there is low working opportunity in economic activities due to physical barrieriness, female move out in out-door activities at very low wage rate to meet their hands to mouth economy and results more work participation rate in some parts of West *Rarh* and Plateau Fringe. Highest number of female participated in house hold industries in North Bengal Plain as main worker and many of the rural female participated in different agricultural activities with male and shows medium work participation rate. On the contrary South Bengal Plain (0.31) and East *Rarh* Plain (0.35) have shown very poor work participation of female due to exclusion of their position which is occupied by huge number of male in-migration from other region.

Table 4. Inter-regional composite index of total male main work participation, 2011

Regions	TMMW (X ₁)	CUL (X ₂)	A. Lab (X ₃)	HHI (X ₄)	OW (X ₅)	Iij					CI
						(X ₁)	(X ₂)	(X ₃)	(X ₄)	(X ₅)	
H & T	57.79	28.57	22.07	1.77	47.59	0.54	0.60	0	0	1.00	0.43
NBP	57.73	33.01	37.85	2.21	26.93	0.54	0.99	0.97	0.14	0	0.53
SBP	68.48	24.14	38.41	3.53	33.92	1.00	0.20	1.00	0.55	0.34	0.62
ERP	62.03	21.86	34.01	4.98	39.14	0.72	0	0.73	1.00	0.59	0.61
WRPF	45.32	33.11	27.89	3.90	35.10	0	1.00	0.36	0.66	0.40	0.48

Table 5. Inter regional composite index of total female main work participation, 2011

Regions	TFMW (X ₁)	CUL (X ₂)	A. Lab (X ₃)	HHI (X ₄)	OW (X ₅)	Iij					CI
						(X ₁)	(X ₂)	(X ₃)	(X ₄)	(X ₅)	
H & T	16.21	13.96	27.30	3.46	55.28	1.00	0.97	0.28	0	1.00	0.65
NBP	12.63	11.02	36.93	24.07	27.98	0.52	0.58	0.63	0.74	0.02	0.50
SBP	8.76	6.81	19.47	31.22	42.51	0	0.02	0	1.00	0.54	0.31
ERP	9.96	6.68	41.75	15.81	35.75	0.16	0	0.8	0.44	0.37	0.35
WRPF	9.31	14.20	47.34	11.14	27.31	0.07	1.00	1.00	0.28	0	0.47

3.3 Determinants of Work Participation

Rural work participation is determined by several socio economic, demographic, agricultural variables. Dasgupta and Golder (2006) argued that number of children (below the age group 5) in the house hold and fertility is related to direct negative effect on female work participation whether sex ratio increased the participation rate in rural areas significantly. Tables 6-9 are analyzed correlations between total female main worker with their level of education, agricultural and non-agricultural worker with different socioeconomic variables, respectively. Different variables are taken at district level and correlation matrix has done by undertaking different variables for 18 districts in West Bengal. Irrigation is an important agricultural factor that also has an impact on female work participation. The study reveals that the regression line indicates negative relation between percentage of irrigated area and female main work participation. It means if percentage of irrigated area is increased, female work participation is decreased. Here the slope of the regression line is very low (-0.0631) and the coefficient of determination is also less i.e. $R^2 = 0.1417$. It means only 14% depended variables (FMWP) is predicted by independent variable (percentage of irrigated area).

Though the relationship is not significantly strong, but together with other variables, it can also alter the rate of FWP in rural counterparts. Female work participation is directly linked with the level of education because it is an important socio cultural indicator. Though literacy and female work participation form a U-shaped pattern, variation in the level of education can alter the work participation rate. Level of education depicts a U-curved pattern of female work participation in a complex situation caused by diversification of values and serious ethical norms of the morality of patriarchy and the cultural frame work is being normally different in Muslim vs. Hindu modes of working (Mammen and Paxson, 2000; Goldin, 1994; Olsen and Metha, 2006).

Female work participation (Y1) is positively correlated with illiterate female main worker (Y2, $r = 0.885$), literate female main worker (Y3, $r = 0.855$), literate but below matric/secondary female main worker (Y4, $r = 0.887$), matric/secondary but below graduate female main worker (Y5, $r = 0.535$), graduate and above other than technical degree female main worker (Y7, $r = 0.595$). Here correlation is significant at 99% significant level with the Y2, Y3, Y4, Y7 variables and only Y5 variable is significant at 95% significance level. Degree of strength is very high in Y2, Y3, Y4 variables because r value is more than 0.8 and strength is medium (r value in between 0.4 and 0.6) with Y5 and Y7 variables. On the other hand total female main worker (Y1) is negatively related with technical diploma or certificate not equal to degree female main worker (Y6) and the technical degree or diploma equal to degree or post-graduate degree female main worker (Y8) but this relationship is not significant (Table 6). Here in table 7,

most interesting thing is that, (V1) is positively related with only two variables i.e. (V2) percentage of ST ($r = 0.497$) and (V6) Per capita bank deposit ($r = 0.150$). If percentage of ST people is increased, female main worker is also increased and the relationship is significant at 95% significance level where strength of relationship is medium i.e. above 0.4. But V6 variable is not significantly related with V1 because p value is more than 0.01 which reject the relationship at any level. V1 is negatively related with other four variables where V7 is significantly related with female main work participation at 95% significance level. Here Pearson's R -value is -0.550 which shows medium strength of significance at 16 degree of freedom. It's mean if area under cultivation is decreased then female main work participation also decreased. V1 variable is also negatively related with V3 and V4 variable, but these two variables i.e. gross domestic product and net domestic product are not significantly related with female main work participation rate because p -value is more than 0.01 which accepted null hypothesis and reject alternative one. Due to the supply side effect, social orthodoxy, unitary family system, falling employment opportunities due to the financial crisis of 2008 in India, higher proportion of people attending in the educational institutions of 15-24 age groups (particularly women) and the cultural barriers in the frame of patriarchal societies and lastly the National Rural Employment Guarantee Act (NREGA) all together determinate female work participation which is showing decreasing trend in female main work participation in the recent decades (Chowdhury, 2011; Siddiqui et al., 2017; Hirway, 2012; Rodgers, 2012; Abraham, 2013; Neff et al., 2012). The correlation between female agricultural workers (X1) with nine such socio-economic variables depicts in table 8. Here most interesting thing is that, (X1) is positively related with only three variables i.e. X2 ($r = 0.655$ at 0.01 significance level), X8 ($r = -0.605$), and X7. It's mean if percentage of scheduled tribe, area under rice production and growth rate of enterprise is increased; female participation in agricultural activity is also increased. Female agricultural workers (X1) are negatively related with rest of the other variables. Among of them X3 ($r = -0.487$), and X10 ($r = -0.537$) variables are significant at 95% significance level (2-tailed). There is a positive correlation between female non-agricultural workers (Z1) with per capita bank deposit (Z4, $r = 0.238$), per capita bank advance (Z5, $r = .539$ at 0.05 level), growth rate of enterprise (Z6, $r = 0.457$), and percentage of fallow land (Z8, $r = 0.307$) and negatively related with percentage of net-sown area (Z2, $r = -0.494$ at 0.05 level), percentage of cultivated area (Z3, $r = -0.443$) and area under rice production area to total area (Z7, $r = -0.602$ at 0.05 significant level). If net sown area, percentage of cultivated area and rice production area are increased, then female non-agricultural workers are decreased because they engaged more in agricultural activities and with the increase of per capita bank deposit, per capita bank advance, growth

rate of enterprise and percentage of fallow land push female to participate in non-agricultural activities rather than agricultural sectors due to increase job opportunity and savings (Table 9).

Table 6. Correlation between total female main worker and their level of education

Variables	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
Y1	1							
Y2	.885**	1						
Y3	.855**	.817**	1					
Y4	.887**	.806**	.988**	1				
Y5	.535*	0.115	0.209	0.295	1			
Y6	-0.347	-0.126	-0.048	-0.159	-.584*	1		
Y7	.595**	0.222	0.301	0.355	.949**	-.471*	1	
Y8	-0.164	0.228	0.182	0.069	-.827**	.649**	-.666**	1

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

Table 7. Correlation between total rural female main worker and socio-economic variables

Variables	V1	V2	V3	V4	V5	V6	V7
V1	1						
V2	.497*	1					
V3	-0.44	-0.466	1				
V4	-0.44	-0.478	.999**	1			
V5	-.498*	-.524*	.614**	.617**	1		
V6	0.150	-0.152	.561*	.559*	.539*	1	
V7	-.503*	-.550*	.602*	.610**	.990**	.518*	1

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

Table 8. Correlation between female agricultural workers and socio-economic variables

Variables	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10
X1	1									
X2	.655**	1								
X3	-.487*	-0.378	1							
X4	0.375	-0.152	.745**	1						
X5	-0.303	0.055	.544*	.818*	1					
X6	-0.453	-0.066	-0.091	-0.156	0.038	1				
X7	0.418	-0.015	-0.005	-0.102	-0.445	-0.321	1			
X8	.605*	-.569*	.608**	.547*	0.157	0.067	0.052	1		
X9	-.436	-.550*	.536*	.518*	0.039	-0.063	0.216	.824**	1	
X10	-.537*	-0.458	0.413	0.054	0.125	0.326	-0.25	0.236	0.077	1

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

Table 9. Correlation between female non-agricultural workers and socio-economic variables

Variables	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8
Z1	1							
Z2	-.494*	1						
Z3	-0.443	.839**	1					
Z4	0.238	-0.338	-0.435	1				
Z5	.539*	-0.337	-0.465	.818**	1			
Z6	0.457	0.025	-0.017	-0.156	0.038	1		
Z7	-.602*	-0.114	-0.058	-0.102	-0.445	-0.321	1	
Z8	0.307	-0.48	-0.005	-0.2	-0.193	-0.055	0.064	1

* Correlation is significant at the 0.05 level (2-tailed); ** Correlation is significant at the 0.01 level (2-tailed)

4 CONCLUSIONS

The present study empirically examines the nature and determinants of female work participation and effect of variations in regional spread. Disparity in work participation is an important issue. It shows the situation where female work participation differs from male work participation rate. South Bengal Plain and East *Rarh* Plain experienced maximum disparity and gender gap in work participation in all the social groups with some little exceptions. Technological innovation, impact of green revolution in this fertile Gangetic plain improves the quality and quantity of food production stretch out male from others region and exclude female enhances highest disparity and gender gap in work participation. Due to social cultural and economic factors, female participation in agricultural and non-agricultural sectors has shown a different nature in different social components of the society. Scheduled component participated more in agricultural sectors rather than the non-Scheduled component. But most of the tribal communities in West Bengal are marginalized in working sector that results high variation in main working activity but low variation in total worker. Several socioeconomic, demographic, cultural factors determined the female work participation in main economic activity. Level of urbanization, sex ratio, level of education, agricultural modernization, family size and their attitude to work, attitude towards female's work in outdoor activity, marital status, age specific fertility, etc. totally act as influential factors at different rate in different sociocultural sphere. This paper shows correlation of female main worker with some socioeconomic variables where some of the variables are positively correlated and rest of the others negatively correlated.

ABBREVIATIONS

CI: Composite Index; **CUL:** Cultivator; **A. Lab:** Agricultural Labour; **ERP:** East *Rarh* Plain; **FWPR:** Female Work Participation Rate; **H & T:** Hill and *Terai*; **NBP:** North Bengal Plain; **OW:** Other Worker; **SBP:** South Bengal Plain; **TFMW:** Total Female Main

Worker; **WPR:** Work Participation Rate; **WRPF:** West *Rarh* and Plateau Fringe.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

REFERENCES

- Abraham, V., 2009. Employment growth in rural india: distress driven? *Economic & Political Weekly*, 44(16), 91-104.
- Arun, S., 2001. Does land ownership make a difference? Women's roles in agriculture in Kerala, India. *Gender perspectives on property and inheritance*, 7(3), 19-27. DOI: <https://doi.org/10.1080/741923248>
- Banerjee, A., and Raju, S., 2009. Gendered mobility: Women migrants and work in urban India. *Economic and Political Weekly*, 54(28), 115-123.
- Bardhan, P. K., 1979. Labor supply functions in a poor agrarian economy. *The American Economic Review*, 69(1), 73-83.
- Chakraborty, I. and Chakraborty, A., 2010. Female work participation and gender differential in earning in West Bengal. *Indian Journal of Quantitative Economics*, 8(2), 98-114.
- Chowdhury, S., 2011. Employment in India: What does the latest data show?. *Economic and Political Weekly*, 46(32), 23-26.
- Cooney, R. S., 1975. Female professional work opportunities: A cross-national study. *Demography*, 12(1), 107-120. DOI: <https://doi.org/10.2307/2060736>
- Dasgupta, P., and Goldar, B., 2006. Female labour supply in rural India: An econometric analysis. *Indian Journal of Labour Economics*, 49(2), 293-310.
- Datta, A., and Mishra, S. K., 2011. Glimpses of women's lives in rural Bihar: Impact of male migration. *The Indian Journal of Labour Economics*, 54(3), 457-477.
- Dev, S. M., 2004. Female work participation and child labour: Occupational data from NFHS. *Economic and Political Weekly*, 39(7), 736-744.

- Ghosh, B., 2001. Women's work and informal sectors: two studies in Burdwan, West Bengal. *Socialist Perspective*, 29(1-2), 1-23.
- Goldin, C., 1994. *The U-shaped female laborforce function in economic development and economic history*, NBER working paper series, National Bureau of Economic Research, 4707, Cambridge.
- Gulati, L., 1975. Occupational Distribution of Working Women: an Inter-State Comparison. *Economic and Political weekly*, 10(43), 1692-1695.
- Gulati, L., 1976. Unemployment among Female Agricultural Labourers. *Economic and Political Weekly*, 11(13), A31-A39.
- Hirway, I., 2012. Missing Labour Force: An Explanation. *Economic and Political Weekly*, 47(37), 67-72.
- Hossain, M., Bose, M. L., and Ahmad, A., 2004. Nature and impact of women's participation in economic activities in rural Bangladesh: Insights from household surveys. Working Papers, Department of Economics, Lund University, 20, 1697-1704.
- Jain, D., and Chand, M., 1982. Women's Work and Employment, Report on a time allocation study- Its methodological implication. Institute of Social Studies Trust, New Delhi.
- Kundu, A., and Rao, J. M., 1983. Inequality in Educational Development: issues in Measurement Changing Structure and its Socio-economic Correlates with Special Reference to India. In Moonis Raza (ed.), *Educational Planning: A Long term Perspective*, NIEPA, New Delhi.
- Mammen, K., and Paxson, C., 2000. Women's work and economic development. *The Journal of Economic Perspectives*, 14(4), 141-164.
- Mistry, M. B., 2005. Muslims in India: A demographic and socio-economic profile. *Journal of Muslim Minority Affairs*, 25(3), 399-422. DOI: <https://doi.org/10.1080/13602000500408468>
- Mitra, A., and Singh, P., 2006. Human capital attainment and female labor force participation: The Kerala puzzle. *Journal of Economic Issues*, 40(3), 779-798. DOI: <https://doi.org/10.1080/00213624.2006.11506945>
- Nayyar, R., 1987. Female participation rates in rural India. *Economic and Political Weekly*, 22(51), 2207-2216.
- Neff, D. F., Sen, K., and Kling, V., 2012. *The Puzzling Decline in Rural Women's Labor Force Participation in India: A Reexamination*. GIGA Working Paper No 196, German Institute for Global and Area Studies, Hamburg, Germany.
- Olsen, W., 2006. *A Pluralist Account of Labour Participation in India*. Economics Series Working Papers, GPRG-WPS-042, Department of Economics, University of Oxford, Oxford, UK.
- Ray, S., and Debnath, M., 2018. Disparity of female work participation in agricultural regions of West Bengal. *Indian Journal of Social Research*, 59 (1), 5-27.
- Rodgers, J., 2012. *Labour Force Participation in Rural Bihar: A Thirty-year Perspective Based on Village Surveys*. IHD Working Paper Series, WP 04/2012, Institute for Human Development, New Delhi.
- Saha, B., and Bahal, R., 2010. Livelihood diversification pursued by farmers in West Bengal, Indian. *Research Journal of Extension Education*, 10(2), 1-9.
- Siddiqui, M. Z., Dutt, K. L., Lockie, S., and Pritchard, B., 2017. Reconsidering women's work in rural India. *Economic and Political Weekly*, 52(1), 45-52.
- Singh, U. V., and Mishra, N. K., 2013. Women work participation in rural Uttar Pradesh: A regional analysis. *International Journal of Social Science & Interdisciplinary Research*, 2(8), 47-57.
- Sinha, J. N., 1975. Female Work Participation: A Comment. *Economic and Political Weekly*, 10(16), 672-674.
- Sinha, S., 2005. Female work participation rates in rural West Bengal: A village level Analysis. *Indian Journal of Labour Economics*, 48 (3), 563-577.
- Sopher, D. E., 1974. Measurement of disparity. *The Professional Geographer*; 26(4), 380-392. DOI: <https://doi.org/10.1111/j.0033-0124.1974.00389.x>
- Srivastava, N., and Srivastava, R., 2010. Women, work, and employment outcomes in rural India. *Economic and political weekly*, 45(28), 49-63.
- Verma, N. M. P., and Bano, R., 1998. Determinants of women workers' participation: Notes on some interdisciplinary controversies. *Indian Journal of Industrial Relations*, 34(1), 80-96.
- Vlasblom, J. D. and Schippers, J., 2006. Changing dynamics in female employment around childbirth evidence from Germany, the Netherlands and the UK. *Work, Employment and Society*, 20(2), 329-347. DOI: <https://doi.org/10.1177/0950017006064117>
