Economic empowerment of rural and urban women in India: A comparative analysis

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Abstract
The status of women is intimately connected with their economic situation depending upon the opportunity for participation in economic activities. The census data, 2011 shows a vast inequality between rural and urban women work participation as urban women associated with economic activities is just about half of the rural women. Available pieces of the literature revealed how the employment status of women makes them empower, but limited research has been conducted on the comparison of women empowerment in the rural-urban area in different dimensions. In this perspective, assuming that women’s economic empowerment is dependent on work participation, the present study attempts to compare the magnitude of women’s economic empowerment in urban India with its rural counterpart, focusing on various dimensions of work participation. This study is entirely based on secondary databases collected from the Census of India, 2011 and Periodic Labour Force Survey (PLFS) 2019-20. Economic Empowerment Index (EEI) of women has been measured with the help of work participation, literate women work share, educational level-wise women work participation, work share by married women and job profile wise women work share using the widely adopted normalization technique. The result of the study is showing that the rural women are more engaged in the workforce in all the selected dimensions. The overall analysis is reflected in EEI, which proves that rural women are more economically empowered in comparison with their urban counterparts.

Keywords Economic empowerment · Job profile · Normalization technique · Unemployment · Rural-urban women · Women’s work participation

1 Introduction
Employment is the source of income that ensures the individuals' economic empowerment. Irrespective of gender, being engaged in paid work is the primary step to being empowered. It means economic empowerment is the fruit of participation in paid work. Particularly for women, when they are associated with paid work, they hold power to make their decisions on their own [1, 2] and contribute to their family [3, 4], which leads them to be more empowered. For a woman, working status is a crucial determinant of her empowerment status [5] and economic independence is one of the essential factors for overall well-being [6–8]. Economically independent women with the contribution to her family enjoy their rights and hold more power with a high level of self-confidence [9–13] and they are more financially stable than those women who are not engaged in the workforce [14]. Studies have found that women engaged in economic activity outside of her family helps to increase their decision-making power and leads to more control over resources [15]. Another study by Van den Broeck & Maertens in 2017 traced out that women’s participation in off-farm economic activity increases their income level, which improves their level of happiness [16]. The working status also helps to upgrade her socio-economic condition, quality of health [17, 18], and standard of living [19]. Many prominent scholars like Murdock (1949), D’Andrade (1966), Boserup (1970), Ember and Ember (1971) established a direct...
relationship between participation in economic activities and up-gradation of status in the society [20–23]. According to Datta and Sinha (1997), female participation in agriculture leads to a higher status [24]. Similarly, D’Andrade in 1966 stated participation in economic activities makes females enjoy power and hold control over the activities of households [21]. Believing on these relevant studies, the present study assumes that women’s economic empowerment depends on work participation.

However, historically it has been proved that in a patriarchal society, women work participation is significantly less as compared to their male counterparts, which forces them to be dependent either on her father, brother before marriage or on her husband after marriage. Unfortunately, India is also an exception of this faulty system. In the context of inequality, the welfare approach in Geography suggested by Smith in 1977 was focused on ‘who gets what, where and how?’ the analysis of social well-being concerns itself with problems of inequitable distribution across different population categories. Within this framework, analysis of gender disparities is located [24]. They addressed towards inter-gender disparity in this country, only 25.51% of women are engaged in the workforce, whereas for men the percentage is more than double i.e. 53.26%. Like inter-gender disparity, the intra-gender disparity is also pointing toward the similar condition in India. It also has come to light that there is a vast inequality between rural and urban women work participation. At the national level, 30.03% of rural women are engaged in economic activities. This figure decreased to 15.44% of urban women associated with economic activities, about half of the rural women. Urbanisation is often associated with the greater independence of women and the erosion of patriarchal power relations and values [25]. In counter-argument, Bhagat in 2017 stated that Indian cities have failed to achieve the goal of gender equality, as patriarchal norms continue to play an essential role in urban social structure [26]. When women worldwide are engaged in the debate over their right to equal pay, India needs to keep up with the number of women who participate in the workforce. The anomaly in women engaged in employment in urban and rural India is also an area that needs to be addressed by policymakers [27].

The pieces of the literature revealed how the employment status of women makes them empower, but limited research has been conducted on the comparison of women empowerment in the rural-urban area in different dimensions. However, from the last couple of PLFS surveys it has been found that the urban women’s unemployment rate is higher as compared to its rural counterpart. In other words, employment among rural women is high and the gap of employment rate between rural-urban women is high. From this perspective, in the study, an attempt has been made to compare the magnitude of women’s work participation in urban India with its rural counterpart based on their literacy status, education level and marital status. Besides, a section has been added on women’s work participation in different job profiles to understand better the quality of work they are engaged with. Apart from this, to analyse the economic empowerment of women in both rural and urban areas five major components have been taken into consideration i.e., women work participation, women work participation based on literacy status, educational level-wise women work share, married women work participation and working women and their profile of the job.

Thus, the study has been divided into seven sections and in each section, a comparative analysis of rural and urban women workforce at the national level as well as state-level has been portrayed. In the first part, the women work participation rate has been analysed. The second part deals with the women work share based on literacy, which means the proportion of literate women engaged in economic activity out of total literate women. The third part is devoted to analysing educational level-wise women work participation. In the fourth section, the impact of marital status has been assessed by measuring the share of married women workers out of total married women in rural and urban India. The fifth part attempts to figure out the work shared by women engaged in the different profiles of jobs. In the sixth part, the overall economic empowerment of rural and urban women has been explained. The current scenario of rural and urban women workshare has been analysed in the seventh section. The last section concludes with an overview of the study.

2 Database and methodology

This study is quantitative in nature and entirely based on secondary databases. All the relevant data has been collected from the different series of Census of India 2011 [28]. Based on the collected database, relevant statistical techniques have been applied for the empirical result. Work Participation Rate (WPR) of women has been measured applying the formula used in the census 2011-

\[
WPR = \frac{Total\ Working\ Women}{Total\ Women} \times 100
\]

Like WPR, the other fields i.e. literate women work share out of total literate women, educational level-wise women work participation, work share by married women out of total married women and work share by women in different job profiles also have been calculated using the formula mentioned above.
Besides these, the Economic Empowerment Index (EEI) of women has been measured with the help of the variables mentioned above. EEI is the composite score of the normalised values of the five variables. For calculating the index widely accepted normalization formula has been adopted here:

\[
\text{Index}_{X_i} = \frac{X_i - X_{\min}}{X_{\max} - X_{\min}}
\]

Where,

- \(X_i\) is the observed value of the variable
- \(X_{\max}\) is the maximum value of the variable
- \(X_{\min}\) is the minimum value of the variable

The index range varies from ‘zero’ to ‘one’. A higher value indicates greater level of economic empowerment and a lesser value reflects a lower level of empowerment. At first, the index values of all the unidirectional individual variables have been calculated using the formula. In the second step, all the indices values have been summed up and divided by the number of variables used to calculate the EEI of rural and urban women separately.

Apart from the census data, the Periodic Labour Force Survey (PLFS) of July 2019–June 2020 database [29] has been used to find the present scenario of women work share. From the database, LFPR and UR have been calculated using the following formulas adopted from PLFS 2019-20:

\[
\text{LFPR} = \frac{\text{No. of employed women} + \text{No. of unemployed women}}{\text{Total women}} \times 100
\]

\[
\text{UR} = \frac{\text{No. of unemployed women}}{\text{No. of employed women} + \text{No. of unemployed women}} \times 100
\]

3 Result and discussion

3.1 Women work participation scenario in rural and urban India

In an international comparison of the work participation rate of urban women in 38 countries made by Collyer and Langlois, India was fourth from the bottom; the rates were much higher in USA, countries of Western Europe, Japan and other developed countries [30]. According to the Press Trust of India (PTI), the WPR of women in urban India is significantly lower and needs improvement [27]. The present study also reveals a vast difference between rural and urban women’s work participation rates in India. The proportion of women engaged in the workforce is double in rural India than the urban (Figs. 1 and 2). Reddy in 1979 also extracts similar results that rural female activity rates are significantly higher in all parts of India except in Punjab and the extent of inter-state variation is wider in the case of rural female activity than that of urban female activity rates. The reasons behind urban-rural differences in female activity rates identified by him are differences in the occupational pattern, variation in the educational requirements for entry into jobs and disparities in income levels. Engagement in economic activity is one of the prime criteria for becoming empowered. Sinha in 1971 has found that the opportunities of higher wages in urban areas is a responsible factor for the lower participation of urban women. He stated that the relatively high wages offered to male workers in most activities in urban areas might reduce the economic pressure on women’s work. The census data in this study points towards the more economic empowerment of rural women than the urban one, which means in India, rural women’s work participation is higher than that of urban women. At the national level, 30.03% of rural women are engaged in the workforce and in urban it is only 15.44%, about half of the rural. Except for Delhi and Chandigarh, all the states and UTs have recorded the same result at the national level, i.e. women living in urban areas are proportionally less engaged in economic activity as compared to rural counterparts. However, the magnitude of women’s work participation differs among the states. There are eighteen states/UTs for rural and urban where the work share is higher than the national level for the respective categories.

From the regional pattern of women’s work participation, there is a clear division between south and north India in both the cases of rural and urban women. Women’s work participation is comparatively lower in northern states than in the southern states of India, and mainly this feature is more prominent in urban women’s work participation (Figs. 1 and 2). The lower WPR in the north seems to reflect strong cultural and religious factors and less the socio-economic status concerns, which are more robust in the more developed and educated South and West [31]. On the other side, in the northeast states, women’s work participation is higher in both the rural and urban areas; however, in all cases, rural women’s work participation is greater than its urban counterpart. The active involvement of women in northeast India is that in this region, a large section of the total population is covered by tribal people and different studies have already discovered that the work participation among tribal women is very high. Even some tribal communities follow the matriarchal social system in this region, which leads women to engage in the workforce in a large number.

The maximum work share for rural women has been recorded in Nagaland (52.26%) followed by Himachal Pradesh, Chhattisgarh, Andhra Pradesh and Sikkim; the minimum was in Delhi (9.72%) followed by Lakshadweep,
From another angle, the gap between rural and urban women’s work participation also varies from $-1.81$ to $30.65\%$. The negative gap indicates the proportion of urban women’s work share is more significant than its rural counterpart, and a positive gap indicates the opposite. At the national level, the gap was $14.59\%$. There were only two UTs, namely Chandigarh and Delhi where negative gap has been recorded i.e. $-1.81\%$ and $-0.88\%$ respectively. On the other hand, the highest positive gap between rural and urban was in Rajasthan ($30.65\%$), which is more than double compared to the national level gap. Chhattisgarh, Himachal Pradesh and Nagaland were the states where the gap was

Chandigarh and Punjab. On the other side, the highest work participation for urban women has been noticed in Manipur ($33.17\%$) followed by Mizoram, Nagaland and Sikkim; and the lowest was in Jharkhand ($10.07\%$) followed by Bihar, Lakshadweep and Delhi. It is a striking fact that in the country’s capital state, i.e. Delhi, only $10.6\%$ of urban women are engaged in work; however, in this state, the share of the urban population is $97.50\%$ and $46.48\%$ of it is female. As per NSSO data, urban women work participation in Delhi has been steadily declining for women i.e. $8.8\%$ of urban women above the age of 15 years were engaged in economic activity in 2004-05, which decreased to $8\%$ in 2009-10.

![Fig. 1 Rural women WPR in India](image)
opportunities. Thus, literate women with employment make them more empowered. Chandna et al. in 1980 found that the literacy rate of the urban population is significantly high compared to the rural population in the developing country [34]. In addition to this, it is also found that the literacy rate of urban females is much higher than their rural counterparts. Generally, for urban women it is easy to engage in any workforce as the literacy rate is higher among them than in the rural. However, in India the scenario is quite different. There was a sharp decline in the work participation rate of urban women during the transition from illiteracy to literacy from 1901 to 1961 [30]. At present, there is no change in the situation. As per the 2011 census database of India, at the very high. In Andaman & Nicobar Island the gap was least i.e. 0.16% and for the states it was in Punjab and Goa.

### 3.2 Spatial view of women’s engagement in the workforce based on literacy status

According to Das and Pathak (2012), literacy is an effective tool for empowerment [32] and Tripathy and Raha in 2019 considered that literacy is the parameter that reflects women empowerment precisely [33]. A person’s literacy helps to learn new skills and acquire knowledge quickly, which increases the chance of getting a job. It means there is a positive relationship between literacy status and employment opportunities. Thus, literate women with employment make them more empowered. Chandna et al. in 1980 found that the literacy rate of the urban population is significantly high compared to the rural population in the developing country [34]. In addition to this, it is also found that the literacy rate of urban females is much higher than their rural counterparts. Generally, for urban women it is easy to engage in any workforce as the literacy rate is higher among them than in the rural. However, in India the scenario is quite different. There was a sharp decline in the work participation rate of urban women during the transition from illiteracy to literacy from 1901 to 1961 [30]. At present, there is no change in the situation. As per the 2011 census database of India, at the
national level for urban the share of literate women workforce out of total literate women was only 15.76%, which is very less compared to its rural counterpart i.e. 26.04%. In Punjab and three UTs i.e. Chandigarh, Delhi and Andaman & Nicobar Island, the percentage share of literate women work participation was higher in urban areas than rural areas. Except for these, in all the states/UTs proportion of literate women engaged in the workforce was greater in rural areas than its urban counterpart. At the national level and in most states/UTs the proportion of literate rural women is more involved in different economic activities than the urban. Even in Delhi, only 11.78% of urban literate women are in the workforce, which is less than the national level.

From figure no. 4, the regional disparity is sparkling in that in Western and Northern India literate urban women work participation is low compared to Southern and North-Eastern parts. This is because most of the patriarchal societies in the North and North-West purdah (veil) system are still practised which perpetuates women’s dependency and curtails their freedom [35]. Among the states, literate women’s work share varies from 9.10 to 56.80% for the rural (Fig. 3); and for urban it was 9.12 to 36.60% (Fig. 4). The maximum work participation of literate women in the rural area has been recorded in Nagaland followed by Himachal Pradesh and Mizoram. More than half of rural literate women are engaged in economic activities in all three states. Manipur is at the top of the list for urban, followed by Mizoram, Nagaland and Sikkim. On the other side lowest work share in rural has been found in Delhi followed by Punjab and Chandigarh. In urban minimum work share by literate women has been recorded in Jharkhand along with Bihar, Rajasthan and Gujarat. From another angle of view, the gap between rural and urban women work share based on literacy status was 10.28% at the national level. Himachal Pradesh and Nagaland have positioned in the upper part of the list of literate women work participation for both the rural and urban as the schooling revolution has raised the literacy status in general and women in particular in Himachal Pradesh [36], however the gap has been recorded highest in these states i.e. 29.22% and 27.43% respectively. Chhattisgarh, Maharashtra, Rajasthan and Uttarakhand are the states where the gap is more than double the national average. In Daman & Diu, Goa and Jammu & Kashmir the gap was very low. On the other side, in some states, a negative gap has been recorded where a higher proportion of literate women are engaged in the workforce in urban compared to their rural counterparts. Andaman & Nicobar Island, Punjab, Delhi and Chandigarh have fallen in this category. Because of higher mechanization in agriculture and limited growth of the non-agricultural sector in Punjab, it is difficult to get employment, especially for rural women [37, 38]. In Delhi, the opportunity is higher for urban women as there are many IT sectors, startups, and private sectors where they can find a job based on their education and skills.

### 3.3 Educational level-wise women work share in India

Neoclassical theory predicts that increases in women’s education should usually lead to a rise in women’s labour force participation rate. A higher level of education makes people more productive, so their potential earnings rise, creating a greater incentive to join the labour force and substitute employment for leisure or home labour [39]. It means educational level positively influences the work participation rate. In contrast to other BRIICs or OECD countries, education and incomes negatively correlate with female labour participation in India [31]. The high educational requirements for employment in the non-domestic services restrict the employment opportunities of the majority of females who have low or no education [40]. From this point of view, this section has measured the educational level-wise women’s work share in rural and urban areas. The result reveals that in India at the national level, positive relation of the workforce exists with the educational level in rural and urban areas. It means the proportion of work share increase with the respective higher educational level. A similar result has been observed in most states at the national level.

Differences in the occupational pattern, variation in the educational requirements for entry into jobs, and differences in income levels appear to be responsible for urban-rural differences in female activity rates [40]. As of the census 2011, the proportion of women who have the below matric level and secondary level educational background is more engaged in the workforce in rural India, about more than double compared to urban women (Table 1). Like the national level, in all the states of the country percentage share of female work participation is higher in the rural region for these two educational levels. In other words, there are none of the states in India where the share of below matric and secondary level educated women workforce is higher in the urban region. For rural, Nagaland has recorded maximum women work share for both the educational level. The highest work participation for urban women has been noticed in Mizoram for the below matric category; however, it is Manipur for the secondary level. Not only have these states, but also in most of the north-east states of India the women work participation rate with these educational qualifications is much higher for both the rural and urban compared to other parts of the country. On the other side in the capital of the country i.e. Delhi the work share is lowest for both the rural and urban regions, i.e. less than 10%. From another angle of view, in Himachal Pradesh the gap of rural-urban women’s work participation was high for below matric and
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Graduated urban women are involved in economic activities as compared to their rural counterparts. However, in the rest of the states/UTs the scenario is the opposite. In Mizoram, the majority of graduated women from rural and urban are engaged in the workforce, i.e. 71.65% and 64.25%. All the north-eastern states have recorded higher women workforce of this educational level. However, in Delhi the proportion of graduated working women in urban is only 27.54%.

It has been noticed that women from rural areas are more involved in economic activities until graduation. When it comes to the technical and postgraduate levels, urban women access more working opportunities than their rural counterparts. Because of that, in the field of technical matric level, i.e. 34.21% and 36.07% respectively. In most south and western Indian states, the gap is higher for both the level of education compared to other parts of the country.

The high unemployment rate among educated women in urban and rural areas also suggests that many women would like to work if suitable jobs are available [40]. The proportion of graduated women of rural India is more engaged in the workforce than the graduated urban women (Table 1). As per the 2011 census, 33.92% of graduated rural women have been recorded as employed at the national level, whereas it was only 28.62% in urban. Only six states/UTs namely Punjab, Chandigarh, Delhi, Arunachal Pradesh, Dadra & Nagar Haveli, Kerala, and Puducherry had a higher proportion of graduated urban women are involved in economic activities as compared to their rural counterparts. However, in the rest of the states/UTs the scenario is the opposite. In Mizoram, the majority of graduated women from rural and urban are engaged in the workforce, i.e. 71.65% and 64.25%. All the north-eastern states have recorded higher women workforce of this educational level. However, in Delhi the proportion of graduated working women in urban is only 27.54%.
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the patriarchal system, where men are the principal earning members. As a result, married women entirely depend on their husband and don’t have the decision-making power of the family. In most cases, they feel powerless and experience domestic violence. NFHS-4 database reveals that more than 30% of married women have faced domestic violence committed by their husbands. In most cases, they prefer to be silent about the violence happening to them and not take any legal action as they are not economically independent. Generally, married women engaged in the different paid workforce are more empowered and can make their own decisions. She can also contribute to the household’s expenditure, which leads to better education for their diplomas and technical degrees or postgraduate urban women’s work share is higher at the national level and in most states (Table 1).

3.4 Work participation scenario of married women

The marital status of women is an essential factor for analysing women’s work participation. Many studies have found that husband’s income leads to the withdrawal of women from the labour force through a household income effect. There is a lower probability of women being in the labour force when their household income is higher apart from their earnings [39, 41]. Indian society mainly follows the patriarchal system, where men are the principal earning members. As a result, married women entirely depend on their husband and don’t have the decision-making power of the family. In most cases, they feel powerless and experience domestic violence. NFHS-4 database reveals that more than 30% of married women have faced domestic violence committed by their husbands. In most cases, they prefer to be silent about the violence happening to them and not take any legal action as they are not economically independent. Generally, married women engaged in the different paid workforce are more empowered and can make their own decisions. She can also contribute to the household’s expenditure, which leads to better education for their

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children and her family’s economic well-being. This financial empowerment gives her the strength to raise their voice against the violence that happens to them. It means that married women’s decision-making power reduces domestic violence [42]. Thus, women need to be economically independent even after marriage. However, in India the scenario is quite different; particularly for urban women it is very disappointing (Table 2). At the national level, only 20.29% of married urban women are involved in economic activities as per the 2011 census. Though the proportion of married women work participation in rural was satisfactory. About half of the rural women (48.08%) were engaged in the workforce even after marriage, which was more than double compared to their urban counterparts. Among the states of India, Chandigarh was the single state where the urban married women’s work share (21.33%) was higher compared to rural (20.30%). The maximum married women workforce for rural has been recorded in Nagaland (84.58%) followed by Chhattisgarh, Arunachal Pradesh and Rajasthan. On the other side for urban, Manipur ranked top holding 48.76% of married women in the workforce. It means none of the states/UTs where half of its urban married women were involved
in economic activities. However, for rural there were seventeen states/UTs where the proportion of married working women was more than half of its total married women. In Delhi, the married women work participation was lowest for rural and urban i.e. 14.08% and 13.67% respectively. It also has come to light that in more than 60% of states of the country, the proportion of married women engaged in economic activity in the rural area is more than double that of its urban counterparts.

### 3.5 Workshare by women in different job profiles

In census 2011, there are different types of occupational categories. However, in this study the occupations are mainly classified into three categories i.e. high, mid and low profile. Legislators, senior officials and managers, technicians, professionals and associate professionals have been categorised as high-profile jobs. There are clerks, service workers, shop and market sales workers, skilled agricultural and fishery workers, craft and related trades workers, plant and machine operators, and assemblers in the mid-profile job. At the last, elementary occupations have been included in the low-profile job. In this section of the study, the percentage women work share out of the total workforce in different job profiles for rural and urban areas has been portrayed.

In high and mid-profile jobs, urban women should come forward as they are more educated and more familiar with the opportunities. However, the result is different from the expectation (Table 3). As of census 2011, at the national level work share by rural women was 29.53% out of total rural high profile jobholders, though in urban the percentage was only 25.02. At the state level the scenario differs from one state to another. Maximum high-profile job share by women has been reported from Meghalaya i.e. 46.87% and 44.83% respectively in the rural and urban areas. In Delhi this share was only 23.60% by the urban women. There were only ten states/UTs i.e. Jammu & Kashmir, Himachal Pradesh, Chandigarh, Haryana, Delhi, Nagaland, Manipur, Mizoram, Chhattisgarh and Lakshadweep where the high profile job share by its urban women was more remarkable than its rural counterpart. However, in the rest of the states/UTs the scenario was its opposite, which means the rural women’s work share in high profile jobs was higher than the urban. On the other hand, in the mid-profile job, at the national level the urban women’s work share was only 13.89%, whereas in the rural area it was much higher i.e. 23.41%. Like the high-profile job, the maximum women work share in the mid-profile job for both the rural (45.61%) and urban (42.64%) area was from a north-east state i.e. Manipur. The database also reveals that except for Chandigarh, Delhi, Mizoram, Goa and Puducherry in the rest of all the states/UTs the women’s work share of rural areas in the mid-profile job was higher as compared to its urban women counterpart. From the spatial point of view, it has been found that in India’s south and northeast states, the proportion of women engaged in high and mid-profile jobs was much higher in rural and urban areas than in other parts of the country. Particularly in north India, it has been noticed that women’s proportion of participation in the high and mid-profile jobs was much lower. It means there is a spatial variation of women’s workforce across the country. Evans (2020) argued that women residing in the south and north-east India are more educated, own more assets, can choose their life partner and move freely compared to the north and north-west India [43]. Because of the conservative social norms and customs, women are more constrained in the country’s northern states. On the other hand, in north-east India, some ethnic groups believe in matrilineality and follow the matriarchal social system. It gives higher status to women in their society and empowers them to do the job of their own choice.

### 3.6 Economic empowerment index (EEI) of rural-urban women in India

In this section, the Economic Empowerment Index (EEI) of women for rural and urban areas in each state/UTs has been discussed. As already mentioned, higher index values indicate greater economic empowerment of women and
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Increasing both public and private employment and casual wages [44]. Abraham in 2013 also argues that the rising incomes of Indian households have enabled Indian women to withdraw from the labour market. Later on, Klasen and Pieters in 2015 have confirmed that rising levels of household income play an important role in declining rates of women’s labour force participation [45].

The EEI indicates a wide spatial variation of women empowerment scenarios in rural and urban India. Tripura, Chandigarh, West Bengal, Puducherry, Kerala and Lakshadweep are the states/UTs where urban EEI is greater than the national average for rural women. On the other side, the opposite result has been discovered in Rajasthan, Uttarakhand, Jharkhand, Chhattisgarh, Madhya Pradesh and vice versa. From the output of the index, it is clear that rural women are more economically empowered and independent at the national level than their urban counterparts (Figs. 5 and 6). The EEI score for women in rural India is 0.37, much higher than in urban India scored 0.23. This result might be the outcome of NREGA and several studies have emphasized the importance of the National Rural Employment Guarantee Act (NREGA) in raising female labour force participation and wage equality. It was enacted in 2005 and guarantees 100 days of work per year, for a minimum salary fixed by the state (same for men and women), for all rural households willing to do unskilled manual labour with quotas for women [31]. According to existing literature, this programme has significantly impacted rural employment, increasing women's labour force participation and wage equality.

| Table 3 | Job profile wise women work share in India |
|---------|--------------------------------------|
|         | High Profile Job | Mid Profile Job | Low Profile Job |
| Rural   | Urban            | Rural           | Urban          |
| India   | 29.53            | 25.02           | 23.41          | 13.89          | 23.91          | 21.33          |
| Jammu & Kashmir | 24.54   | 27.98           | 20.03          | 9.79           | 4.91           | 9.91           |
| Himachal Pradesh | 31.10 | 31.78           | 13.44          | 12.91          | 18.60          | 18.24          |
| Punjab  | 30.99            | 26.04           | 16.14          | 8.27           | 11.96          | 14.02          |
| Chandigarh | 16.71          | 27.38           | 8.82           | 10.99          | 18.11          | 18.63          |
| Uttarakhand | 28.30         | 23.67           | 12.40          | 8.85           | 13.73          | 13.51          |
| Haryana | 22.29            | 24.43           | 18.77          | 8.38           | 10.05          | 15.31          |
| Delhi   | 20.13            | 23.60           | 6.82           | 8.05           | 18.23          | 17.01          |
| Rajasthan | 23.49           | 22.58           | 26.07          | 11.07          | 34.55          | 16.19          |
| Uttar Pradesh | 27.32          | 20.28           | 22.59          | 10.77          | 10.49          | 9.19           |
| Bihar   | 27.22            | 19.79           | 14.67          | 8.21           | 7.51           | 8.41           |
| Sikkim  | 34.98            | 34.36           | 21.55          | 21.35          | 35.47          | 33.46          |
| Arunachal Pradesh | 30.66    | 28.96           | 24.19          | 23.39          | 31.94          | 26.20          |
| Nagaland | 36.09            | 37.88           | 36.03          | 28.04          | 21.26          | 21.89          |
| Manipur | 37.57            | 39.95           | 45.61          | 42.64          | 33.37          | 23.15          |
| Mizoram | 34.66            | 42.67           | 28.40          | 37.83          | 17.26          | 22.95          |
| Tripura | 31.72            | 28.68           | 18.24          | 12.11          | 40.28          | 31.26          |
| Meghalaya | 46.87            | 44.83           | 26.94          | 26.60          | 29.99          | 32.91          |
| Assam   | 32.50            | 29.17           | 19.40          | 9.38           | 34.65          | 20.62          |
| West Bengal | 29.89           | 26.73           | 26.79          | 15.30          | 18.25          | 20.76          |
| Jharkhand | 30.19           | 22.21           | 27.97          | 9.59           | 14.77          | 14.73          |
| Odisha  | 28.35            | 22.42           | 22.69          | 10.42          | 24.72          | 25.97          |
| Chhattisgarh | 23.43          | 25.56           | 25.86          | 12.29          | 24.49          | 30.41          |
| Madhya Pradesh | 33.65      | 25.62           | 29.82          | 14.78          | 23.22          | 19.41          |
| Gujarat | 30.43            | 20.15           | 29.03          | 8.17           | 22.88          | 19.10          |
| Daman & Diu | 23.40          | 19.00           | 10.64          | 6.52           | 35.81          | 16.65          |
| Dadra & Nagar Haveli | 26.86   | 20.16           | 9.36           | 5.89           | 23.73          | 15.72          |
| Maharashra | 27.00           | 23.77           | 16.53          | 13.53          | 19.52          | 23.76          |
| Andhra Pradesh | 28.77          | 24.45           | 26.49          | 16.15          | 32.47          | 28.58          |
| Karnataka | 31.57           | 25.88           | 26.46          | 19.64          | 32.82          | 27.94          |
| Goa     | 34.45            | 31.77           | 17.05          | 17.69          | 29.78          | 31.25          |
| Lakshadweep | 27.02          | 29.80           | 15.09          | 13.14          | 12.92          | 17.04          |
| Kerala  | 39.74            | 36.37           | 19.93          | 18.04          | 39.89          | 30.75          |
| Tamil Nadu | 32.01           | 27.30           | 24.76          | 19.86          | 34.38          | 28.18          |
| Puducherry| 30.67            | 28.54           | 14.02          | 14.52          | 27.64          | 34.18          |
| Andaman & Nicobar Islands | 34.51      | 31.47           | 17.25          | 15.84          | 17.08          | 17.12          |

Source: Census of India 2011
Gujarat where rural EEI is higher compared to the national average i.e. 0.37, however for urban women it is less than the mean of national level. Nagaland has recorded maximum EEI holding 0.91, followed by Mizoram and Manipur. For the urban women highest EEI has been found in Mizoram i.e. 0.93, followed by Manipur and Nagaland. This scenario indicates that rural and urban women are more economically empowered in northeast India than in the rest of the states/UTs of the country. On the other hand, for urban women EEI, a division has been noticed between the northern and southern states of the country. From the spatial point of view it is clear that in the states of central and north India economic empowerment status of urban women is very dissatisfactory. However, for rural women this condition is much better. Even in the country’s capital state, i.e. Delhi urban women EEI has recorded only 0.12, which is about half of the national level, which also reflects the pathetic condition of urban women in the context of the economic milieu.

3.7 Present situation of rural and urban women workshare from periodic Labour Force Survey (PLFS)

In PLFS (2019-20), the percentage of persons in the labour force in the total population working or seeking or available for work is defined as Labour Force Participation Rate.
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The percentage of employed persons out of the total population is considered as Work Participation Rate (WPR), and Unemployment Rate (UR) represents the percentage of unemployed persons. LFPR and WPR are positive economic empowerment indicators, which means a higher value indicates more empowerment. On the other hand, UR is a negative indicator and lesser the value greater the economic empowerment. The result of the PLFS database indicates that the scenario did not improve much even in 2020. Like the census 2011, rural women’s situation is better compared to their urban counterparts. The PLFS data from 2017 to 2020 shows that the LFPR of rural women was higher all the year than the urban. It means the increasing rate of women LFPR share in rural is greater and because of that, the gap between rural and urban women LFPR is rising every year. Not only the LFPR, the result is also similar for the women WPR. On the other side, in every PLFS, the women UR is higher in urban and the decline rate of urban women UR is prolonged; however, the UR for rural women is very less (Table 4).

PLFS 2019-20 database represents the state-wise spatial scenario of women LFPR, WPR and UR in India. Table 5 shows that at the national level, women LFPR in rural was 24.7% and in urban it was only 18.5; however the share varied from 6.4 to 59.3% for rural and 6.1 to 34.6% for urban. In India, there were only eight states/UTs for urban where...
Table 4  Trend of women Labour Force Participation Rate (LFPR), Work Participation Rate (WPR) and Unemployment Rate (UR) in India from Periodic Labour Force Survey (PLFS) 2017 to 2020

|        | PLFS 2019-20 | PLFS 2018-19 | PLFS 2017-18 |
|--------|--------------|--------------|--------------|
|        | Rural        | Urban        | Rural        | Urban        | Rural        | Urban        |
| LFPR   | 24.7         | 18.5         | 19.7         | 16.1         | 18.2         | 15.9         |
| WPR    | 24           | 16.8         | 19           | 14.5         | 17.5         | 14.2         |
| UR     | 2.6          | 8.9          | 3.5          | 9.9          | 3.8          | 10.8         |

Source: Periodic Labour Force Survey (PLFS), 2019-20

one-fourth women come under LFPR, for rural the number was twenty-four states/UTs. In 2019-20, in Daman & Diu and five states i.e. Manipur, Goa, West Bengal, Assam and Haryana the LFPR of urban women was higher as compared to the rural women. In the rest of the states and UTs it was the opposite, which means rural women were more engaged or seeking or available for work than their urban counterparts. Because of that gap has been created between rural and urban women LFPR. The maximum gap has been found in Dadra & Nagar Haveli (42.2%) followed by Himachal Pradesh, Chhattisgarh, Telangana and Sikkim. On the other side, at the national level women WPR in rural and urban region were 24.0% and 16.8% respectively. Like LFPR, the women WPR in the rural area was more than half of its total women population in Dadra & Nagar Haveli (59.3%), Himachal Pradesh (53.5%) and Sikkim (53.2%); however there was none of the states where urban women WPR share was like this. Even in Delhi rural women LFPR and WPR both were higher. Bihar was the state where the lowest share of women LFPR and WPR has been noticed for rural and urban sectors. In thirty states/UTs the rural women WPR is higher than the urban women WPR; only Chandigarh added in the list of greater women WPR in urban along with the six states/UTs where rural women LFPR was less as compared to urban (Table 5). UR also represents a similar result. There were only four states, namely Chandigarh, Lakshadweep, Manipur and Goa, where the UR of rural women was higher than the urban women; in the rest of India, the result was the opposite. At the national level, rural women UR was 2.6% and for urban women it was 8.6%. These results from the PLFS 2019-20 database indicate that rural women are more involved in the workforce and economically empowered than their urban women counterparts in most states.

4 Conclusions

In the contemporary world of globalization and liberalization, economic empowerment is the foremost pillar to be independent. Financial independence make the people to enjoy their rights properly and to play an important role in the decision making within and outside households which is very important to live with dignity and honour. Financial independence would come through engagement in paid work. Unfortunately, women’s workforce participation in India is less even after seven decades of independence. Particularly for urban women the work participation is not satisfactory. It is a concerning issue that the proportion of women are less engaged in the workforce in urban even after the greater job opportunities and availability of higher remuneration compared to rural areas. A similar scenario has also been experienced for literate women. Although literacy enriches the women to be engaged in the workforce, little share of urban literate women has been found in economic activity in most of the states/UTs of the country. On the other side, the participation of rural literate women in different paid work fields is much higher than the urban counterpart. Similar reflection has appeared in the analysis of women’s attainment of educational level in work participation. Excluding technical/professional degree holders, for the rest of the educated women with different levels work participation in the urban area is lesser than the rural area in most of the states/UTs of the country. In this regard, states should focus on the workforce of literate women in urban areas, whether they face discrimination to get a job or limited job opportunities in the different sectors because of their gender. If this is the case, the administration should take proper actions because jobs should be given based on education and skills, not gender. In many cases, even after being educated, they become unemployed because of a lack of suitable job opportunities. It is not about their preferences or choices; it’s about the discrimination and inequality they usually face in the workplace. From this point of view, the central government should also introduce national policies and laws to ensure a friendly working environment for women and should widely promote it. Non-government organizations like NGOs can come forward for women’s rights in the workplace and drive awareness programmes.

In the patriarchal society, domestic violence against women and suppression of their voice is frequently flashed in the news. It is essential to be independent to raise her voice against the violence that happens to them and can bear her own life even after divorce/separation to get rid of this situation. The study has explored that the participation in the workforce of urban married women is significantly less, though most of the states/UTs married rural women work share is satisfactory. In addition to these, another striking feature found in the study is that the share of rural women
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possible yet. So, the study is restricted to 2011 census data. To strengthen the backdated data, the Periodic Labour Force Survey (PLFS) 2019-20 database published by the Ministry of Statistics & Programme Implementation of India has been used here and that too is available only for giving trace of LFPR, WPR and UR. But, the striking feature is that there is no difference between the two time periods data about the women work participation scenario in urban and rural India. With the data limitation, the future prospects of that study is that with the upcoming census the present scenario can be analysed in comparison with the past scenario. Again,

### Table 5 State wise women Labour Force Participation Rate (LFPR), Work Participation Rate (WPR) and Unemployment Rate (UR) in PLFS 2019-20

| State/UT          | Women LFPR Rural | Women LFPR Urban | Women WPR Rural | Women WPR Urban | Women UR Rural | Women UR Urban |
|-------------------|------------------|------------------|------------------|------------------|----------------|----------------|
| All India         | 24.7             | 18.5             | 24.0             | 16.8             | 2.6            | 8.9            |
| Andhra Pradesh    | 35.9             | 22.8             | 34.9             | 21.1             | 3.0            | 7.8            |
| Arunachal Pradesh | 17.7             | 12.5             | 16.0             | 11.1             | 9.2            | 11.4           |
| Assam             | 12.1             | 14.7             | 10.5             | 12.0             | 12.9           | 18.3           |
| Bihar             | 6.4              | 6.1              | 6.4              | 5.3              | 0.5            | 12.4           |
| Chhattisgarh      | 44.6             | 20.9             | 44.1             | 18.9             | 1.1            | 9.4            |
| Delhi             | 14.6             | 12.7             | 14.6             | 11.4             | 0.0            | 10.2           |
| Goa               | 20.4             | 24.1             | 17.9             | 21.3             | 12.5           | 11.6           |
| Gujarat           | 29.7             | 16.8             | 29.6             | 16.2             | 0.1            | 3.4            |
| Haryana           | 10.1             | 15.4             | 9.6              | 14.1             | 4.9            | 8.4            |
| Himachal Pradesh  | 54.7             | 30.9             | 53.5             | 27.9             | 2.3            | 9.7            |
| Jharkhand         | 29.3             | 12.5             | 29.2             | 11.3             | 0.4            | 9.5            |
| Karnataka         | 31.1             | 20.0             | 30.4             | 16.9             | 2.2            | 15.4           |
| Kerala            | 29.4             | 23.2             | 25.3             | 19.3             | 13.8           | 16.7           |
| Madhya Pradesh    | 31.5             | 18.2             | 31.4             | 17.2             | 0.5            | 5.5            |
| Maharashtra       | 37.9             | 20.6             | 37.4             | 19.4             | 1.1            | 5.6            |
| Manipur           | 20.9             | 27.7             | 18.3             | 25.2             | 12.3           | 8.8            |
| Meghalaya         | 30.4             | 21.6             | 30.0             | 17.6             | 1.4            | 18.3           |
| Mizoram           | 31.6             | 29.1             | 30.8             | 26.5             | 2.8            | 8.8            |
| Nagaland          | 38.2             | 24.1             | 27.9             | 16.7             | 26.9           | 30.9           |
| Odisha            | 27.3             | 18.5             | 26.3             | 17.1             | 3.6            | 8.0            |
| Punjab            | 19.9             | 17.2             | 18.7             | 15.2             | 6.4            | 11.6           |
| Rajasthan         | 32.8             | 14.1             | 32.2             | 13.1             | 1.8            | 7.4            |
| Sikkim            | 54.0             | 34.6             | 53.2             | 33.5             | 1.4            | 3.0            |
| Tamil Nadu        | 38.0             | 26.1             | 36.7             | 24.3             | 3.4            | 6.9            |
| Telangana         | 44.3             | 23.3             | 42.7             | 20.5             | 3.7            | 12.0           |
| Tripura           | 19.8             | 16.4             | 19.3             | 15.7             | 2.5            | 4.2            |
| Uttar Pradesh     | 28.8             | 13.9             | 27.7             | 11.8             | 3.9            | 15.5           |
| Uttarakhand       | 13.5             | 10.1             | 13.3             | 9.0              | 1.1            | 10.2           |
| West Bengal       | 17.5             | 22.3             | 17.0             | 21.2             | 2.8            | 4.9            |
| Andaman & N. Island | 29.8        | 28.2             | 21.9             | 20.2             | 26.5           | 28.6           |
| Chandigarh        | 21.4             | 15.5             | 13.6             | 14.6             | 36.5           | 6.0            |
| Dadra & Nagar Haveli | 59.3         | 17.1             | 59.3             | 17.0             | 0.0            | 0.3            |
| Daman & Diu       | 20.2             | 30.8             | 20.2             | 29.7             | 0.0            | 3.4            |
| Jammu & Kashmir   | 30.3             | 21.6             | 27.7             | 15.1             | 8.4            | 29.9           |
| Ladakh            | 39.1             | 31.2             | 39.1             | 31.2             | 0.0            | 0.0            |
| Lakshadweep       | 35.3             | 20.3             | 22.4             | 16.8             | 36.7           | 17.0           |
| Puducherry        | 30.5             | 22.8             | 27.7             | 20.3             | 9.2            | 11.0           |

Source: Periodic Labour Force Survey (PLFS), July 2019 - June 2020

workers is associated with high profile and mid-profile jobs compared to the urban working women. Lastly, the overall analysis is reflected in EEI, which proves that rural women are more economically empowered than their urban counterparts. It means rural women are more independent, can make their own decisions, and are more self-confident.

All the inferences have been drawn here based on the Census data of 2011, which was conducted almost more than a decade ago. Due to the contemporary situation of World and particularly in India, census supposed to be collected in 2021 for collecting ground-level data has not been
it is expected that, urban women work participation would not be exceeding than rural counterpart as during COVID 19 pandemic urban areas were more exposed to the threat than the rural areas and urban working women suffered a lot becoming jobless.

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**References**

1. Ackah, C., Ahiadeke, C., & Fenny, A. P. (2009). Determinants of Female Labour Force. *Poverty Research Group, Economic and Social Research Council*
2. Afridi, F., Dinkelman, T., & Mahajan, K. (2018). Why are fewer married women joining the work force in rural India? A decomposition analysis over two decades. *Journal of Population Economics, 31*(3), 783–818
3. Hossain, M., & Jaim, W. M. H. (2011). Empowering women to become farmer entrepreneur. In *Paper presented at the IFAD Conference on New Directions for Smallholder Agriculture (Vol. 24, p. 25)*
4. Yusuf, H. (2010). Empowerment of Women and Its Effects In Improving the Socio-economic Condition of Families in West Siau District, Sitaro District. *Journal Lasallian, 7*(1), 90–94
5. Sundari, S. (2020). Structural Changes and Quality of Women's Labour in India. *The Indian Journal of Labour Economics, 63*(3), 689–717
6. Dutta, M. (2000). Women's employment and its effects on Bengali households of Shillong, India. *Journal of comparative family studies, 31*(2), 217–229
7. Mammen, K., & Paxson, C. (2000). Women's work and economic development. *Journal of economic perspectives, 14*(4), 141–164
8. Srivastava, N., & Srivastava, R. (2010). Women, work, and employment outcomes in rural India. *Economic and political weekly, 49*:63
9. Banu, D., Farashuddin, F., Hossain, A., & Akter, S. (2001). Empowering women in rural Bangladesh: Impact of Bangladesh rural advancement committee’s (BRAC’s) programme. *Journal of international women's studies, 2*(3), 30–53
10. Hill, C. (2011). Enabling rural women's economic empowerment: Institutions, opportunities and participation. In *Background paper prepared for the Expert Group Meeting on Enabling Rural Women’s Economic Empowerment: Institutions, Opportunities and Participation, Accra, UN Women in Cooperation with FAO, IFAD, and WFP*
11. Hultberg, L. (2008). *Women empowerment in Bangladesh: A study of the village pay phone program*
12. Kabeer, N. (2001). Discussing Women’s Empowerment Theory and Practice
13. Mason, K. O., & Smith, H. L. (2003). Women’s empowerment and social context: Results from five Asian countries. *Gender and Development Group, World Bank, Washington, DC*
14. Khan, H. (2006). NGOs and gender development, the case of AKRSP in district Chitral. Pakistan: NWFP
15. Anderson, S., & Esowaran, M. (2009). What determines female autonomy? Evidence from Bangladesh. *Journal of Development Economics, 90*(2), 179–191
16. Van den Broeck, G., & Maertens, M. (2017). Does Off-Farm Wage Employment Make Women in Rural Senegal Happy? *Feminist Economics, 23*(4), 250–275
17. Bardhan, P. K. (1979). Labor supply functions in a poor agrarian economy. *The American Economic Review, 69*(1), 73–83
18. Gulati, L. (1975). Female work participation: a study of interstate differences. *Economic and Political Weekly, 35*:42
19. Sharma, A., & Saha, S. (2016). Female employment trends in India: A disaggregated analysis. *The NEHU Journal, 13*(2)
20. Boseroop, E. (1970). *Women’s Role in Economic Development*. London: Allen and Unwin
21. D’Andrade (1996). In E. E. Macoby (Ed.), *‘Sex Difference in Cultural Institutions’*. The Development of Sex Difference *Standford: Standford University Press*
22. Ember, M., & Ember, C. R. (1971). The conditions favoring matrilocality versus patrilocal residence. *American Anthropologist, 73*(3), 571–594
23. Murdock, G. P. (1949). *Social Structure*. New Work: Macmillan
24. Datta, A., & Sinha, S. (1997). Gender disparities in social well-being: an overview. *Indian Journal of Gender Studies, 4*(1), 51–65
25. Tacoli, C. and David Satterthwaite (2013). “Editorial: Gender and Urban Change. *Environment and Urbanisation, 25*(1), 3–8
26. Bhagat, R. (2017). Migration, gender and right to the city. *Economic & Political Weekly, 52*(32), 35–40
27. Anisha, & Singh, March 12, 2018, NDTV. 10% More Rural Women Participate in Workforce than Urban Women in India:NSS Report
28. Census of India. (2011). *Office of the Registrar General and Census Commissioner*. Ministry of Home Affairs, Government of India
29. Periodic Labour Force Survey (2019-20). Ministry of Statistics and Programme Implementation, Government of India
30. Nath, K. (1965). Urban Women Workers: A Preliminary Study. *The Economic Weekly, 1405–1412*
31. Sorasa, P., Mares, J., Didier, M., Guimaraes, C., Rabate, M., Tang, G., & Tuske, A. (2015). Determinants of the low female labour force participation in India
32. Das, D., & Pathak, M. (2012). The growing rural-urban disparity in India: Some issues. *International Journal of Advancements in Research & Technology, 1*(5), 1–7
33. Tripathy, B., & Raha, S. (2019). A Comparative Analysis between Women Work Participation and Literacy Rate in India. *Journal of Scientific Computing, 8*(12)
34. Chandna, R. C., & Sindhu, M. S. (1980). *Introduction to Population Geography*. New Delhi: Kalyani Publishers
35. Dyson, T., & Moore, M. (1983). On kinship structure, female autonomy, and demographic behavior in India.Population and development review,35–60
36. Dreze, J. (1999). A surprising exception. Himachal’s success in promoting female education. *Manushi, 112*, 12–17
37. Baruah, A., & Indervir, S. (2020). Employment of Women in Rural Punjab: Deconstructing Agricultural Growth Policy. *Economic and Political Weekly, 55*(26), 29–35
38. Singh, J., & Goyal, K. (2019). Employment status of women in rural punjab: dwindling trends. *Economic Affairs, 64*(2), 281–290
39. Chatterjee, E., Desai, S., & Vanneman, R. (2018). “Indian paradox: Rising education, declining women’s employment”. Demographic Research, 38(1), 855–878
40. Reddy, N. D. (1979). Female Work Participation in India: Facts, Problems, and Policies. Indian Journal of Industrial Relations, 15(2), 197–212
41. Sarkar, S., Sahoo, S., & Klasen, S. (2019). Employment transitions of women in India: A panel analysis. World Development, 115, 291–309
42. Mondal, D., & Paul, P. (2021). Associations of power relations, wife-beating attitudes, and controlling behavior of husband with domestic violence against women in India: Insights from the National Family Health Survey-4. Violence against women, 27(14), 2530–2551
43. Evans, A. (2020). Why are North and South India so different on gender?. https://www.draliceevans.com/post/why-are-southern-north-eastern-indian-states-more-gender-equal. Accessed on 12th March 2022
44. Imbert, C., & Papp, J. (2015). Labor market effects of social programs: Evidence from India’s employment guarantee. American Economic Journal: Applied Economics, 7(2), 233–263
45. Klasen, S., & Pieters, J. (2015). What explains the stagnation of female labor force participation in urban India? The World Bank Economic Review, 29(3), 449–478

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