

Spatial Pattern of Rural Female's Workforce Participation in Prayagraj District, Uttar Pradesh: A Tehsil-Level Analysis

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Abstract

Rural female are a part of the farming and countryside economy. Yet many people do not notice female's work because much of it happens only in certain seasons is unpaid, informal or done inside the home. This study looks at how rural female work in the Prayagraj district of Uttar Pradesh from 2001 to 2011. It uses data mainly from the Census of India, district reports and other official sources. The study focuses on eight tehsils – Soraon, Phulpur, Prayagraj Sadar, Bara, Karchhana, Handia, Meja and Koraon –. Separates rural female into main workers and marginal workers and looks at their jobs such as farmers, farm laborers, household industry workers and other jobs. The results show differences in how many rural female are working in each area. Handia had the most rural female workers in 2011 while Prayagraj Sadar had the fewest. Female main workers grew in every tehsil from 2001 to 2011 especially in Karchhana Prayagraj Sadar and Phulpur. Female marginal workers changed unevenly – rural female marginal workers grew in six tehsils but fell in Karchhana and Meja. Most jobs for female are still in farming especially in the rural tehsils but the more town-like Prayagraj Sadar had more rural female working in non-farming jobs. The study also shows gains in rural female's literacy and changes in population during the decade. Overall the study shows that rural female worked more from 2001 to 2011 but the type and steadiness of female's work differed a lot across the district. The study suggests that local rules must help rural female get jobs learn new skills find non-farm work and have programmes that care about gender, in rural development.

Keywords: Rural female, female workforce participation, marginal workers, main workers, agriculture, literacy.

1. Introduction

Female have always played a key role in rural economies. In agricultural societies they contribute not only to crop cultivation but also to agricultural labor, livestock management, household production, processing, marketing and other income-generating activities. But much of their work is less visible than men's employment because female often combine productive work and domestic responsibilities (UN Female 2020). Rural female constitutes an important productive force, but their economic contribution is often poorly captured in official statistics.

The problem is more important in developing rural areas where agriculture still provides a major source of livelihood. Female may engage in agricultural production without being recognized as independent

economic agents, especially when their work is unpaid or seasonal. Conventional statistical systems thus tend to underestimate the extent and variety of female's economic activities. Previous work suggests that secondary and seasonal employment are missed in traditional surveys, causing an underestimate of rural non-farm employment (World Bank 1977). This makes Prayagraj district a suitable geographical setting for the study of these issues as it has large rural areas with physical environment, settlement structure, agriculture and urban influence variations. The district comprises of eight tehsils, namely Soraon, Phulpur, Prayagraj Sadar, Bara, Karchhana, Handia, Meja and Koraon. The district had a total population of approximately 5.98 million in 2011, most of whom were residents of rural areas. The present study aims at the changing pattern of the workforce participation of rural female during 2001 to 2011 Census periods. The differences between main and marginal workers and the occupational structure of female employment are given special consideration (Census of India 2001, 2011).

The study also looks at the association between the participation of female in the workforce and general socio-economic characteristics, especially literacy. The study tests: whether there was a significant change in female's workforce participation between 2001 and 2011, whether female's workforce participation varied across tehsils, and whether literacy was related to female's workforce participation. Main worker is one who worked for six months or more during the reference period and earned a livelihood by economic activities such as cultivation, business or employment. Marginal workers are those who worked in an economic activity for less than six months during the reference period, generally due to their work being seasonal, temporary or irregular.

2. Literature Review

The reviewed literature shows that female's involvement in the economy has long been connected to farming systems, family setups, social conditions and opportunities for jobs outside agriculture. **Sisodia's (1985)** study on female farmers in the Chambal Command Area found that female contributed an amount of labor to animal care and farm work. **Mallik and Giri's (1985)** research on rice farming in West Bengal showed that female play a role in tasks that require a lot of hands-on effort like preparing seedlings and planting them. **Mazid's (2002)** study pointed out how important female's work is for keeping households stable. Fisher and others (**Bene et al., 2016**) noted that measuring jobs using standard methods is hard because many rural families do multiple kinds of work and employment can change with the seasons. This matters a lot when looking at how the census defines workers and marginal workers (Office of the Registrar General & Census Commissioner of India (**ORGI 2011**)).

Later studies have looked at how female's work ties into poverty, education, gender bias, informal jobs and support from institutions. **Chattopadhyay, S. K., & Chowdhury, S. (2022)** finds that the decline in female labour force participation in India cannot be explained by education and income alone, and that demand-side constraints and social-institutional factors significantly restrict women's employment opportunities. Studies on self-help groups show that getting access to credit and joining together in groups can help improve females standing and give them more say in household decisions (**Brody et al., 2017; Desai & Joshi 2014**). The overall picture from the literature is clear: understanding female's participation in work isn't, about counting numbers. It also depends on what kind of job they have, how stable it is, which sector it belongs to, their education level and the wider social and economic environment they live in.

3. Objectives of the Study

- To identify spatial variations in female workforce participation among the eight tehsils.
- To examine the distribution of female workers between main and marginal employment.
- To analyze the occupational structure of female workers.
- To examine changes in female workforce participation in relation to literacy

4. Study Area

Prayagraj District lies in the southern part of Uttar Pradesh, extending from 24°47' N to 25°45' N latitude and from 81°31' E to 82°21' E longitude. Situated at an elevation of 98 metres (322 feet), the district occupies the meeting point of the Ganga and Yamuna rivers. It is surrounded by distinct geographical regions: the Baghelkhand plateau to the south and southeast, the middle Ganges valley to the east, the Bundelkhand region to the southwest, the Awadh plains to the north and northeast, and the lower Doab to the west, where it adjoins Kaushambi district.

The climate of Prayagraj is characterized as humid subtropical, marked by three distinct seasons. Summers prevail from April through June, the monsoon arrives in early July and continues until September, and winters extend from December to February. The Ganga and Yamuna are the principal rivers of the district, and the fertile plain lying between them plays a vital role in sustaining agriculture. The chief crops cultivated here are wheat and rice, which serve as the staple food grains of the region.

According to the Census of 2011, the population in the district was 5,954,391 with males accounting for 31,31,807 and female amounting to 28,22,584. It experienced a growth rate of 20.63 percent based on the Census of 2001. The district headquarters are located in Prayagraj (formerly Allahabad). The district has an area of 5,482 square kilometers, and it consists of 20 development blocks and 8 tehsils with up to 3,003 villages according to the Prayagraj statistical bulletin. The literacy of Prayagraj district is 72.3%.

5. Data and Methodology

The study relies completely on secondary data. The main sources of data are the Census of India 2001 and 2011, the District Statistical Handbook and other government publications. There was no household survey conducted for this study.

This study uses a descriptive-analytical research approach with the aim of looking at the spatial patterns of female's participation in the workforce throughout the tehsils of Prayagraj district, Uttar Pradesh. It is based on a quantitative method which makes use of secondary data, allowing for a systematic comparison between two census years and eight spatial areas. The method is comparative in character — it involves both a longitudinal comparison (2001 and 2011) and a cross-sectional one (among the tehsils) — so that both changes over time and differences between areas in regard to female's employment can be examined at the same time.

6. Result

6.1 Spatial Variation of Female Workers between 2001 and 2011

Table1: Spatial Variation of Female Workers between 2001 and 2011

Sr. No.	Name of Tehsils	Total Female Workers (2001)	Total Female Workers (2011)	Change (%)
1.	Soraon	88729	101330	14.20
2.	Phulpur	88429	105039	18.78

3.	Prayagraj Sadar	12415	16592	33.64
4.	Bara	35430	45183	27.53
5.	Karchhana	49685	56896	14.51
6.	Handia	107198	126049	17.59
7.	Meja	55439	58454	5.44
8.	Koraon	48923	60898	24.48
	Total	486248	570441	Avg. 19.52

Source: Census of India

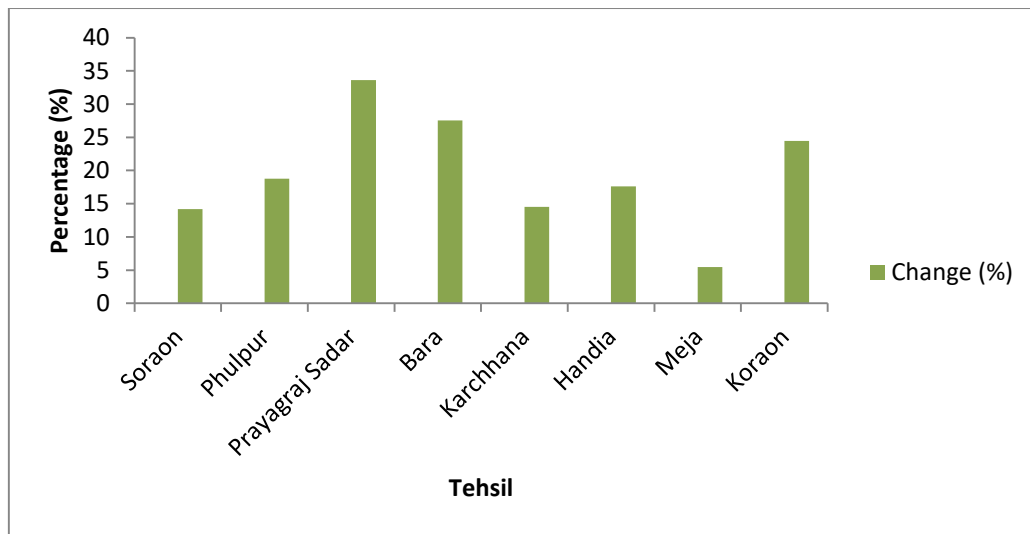


Fig. 1

The table 1 shows the spatial variation of female workers in different areas of Prayagraj district between 2001 and 2011. It shows that the number of female workers increased in all eight areas during this period. Prayagraj Sadar recorded the highest increase (33.64%), followed by Bara (27.53%) and Koraon (24.48%). Phulpur also showed a significant increase of 18.78%, while Handia increased by 17.59%. Soraon and Karchhana had moderate increases of 14.20% and 14.51%, respectively. Meja recorded the lowest increase at 5.44%. Overall, the table indicates that female participation in work increased across all the selected areas from 2001 to 2011.

6.2 Changes in Main and Marginal Female Workers

Table 2: Change in Main Female Workers

Sr. No.	Name	2001	2011	Change (%)
1.	Soraon	31860	41723	30.96
2.	Phulpur	29453	42403	43.97
3.	Prayagraj Sadar	5811	8775	51.01
4.	Bara	19757	22871	15.76
5.	Karchhana	17613	26835	52.36
6.	Handia	35940	47075	30.98
7.	Meja	18131	23765	31.07
8.	Koraon	22502	30150	33.99
	Total	181067	243597	Avg. 36.26

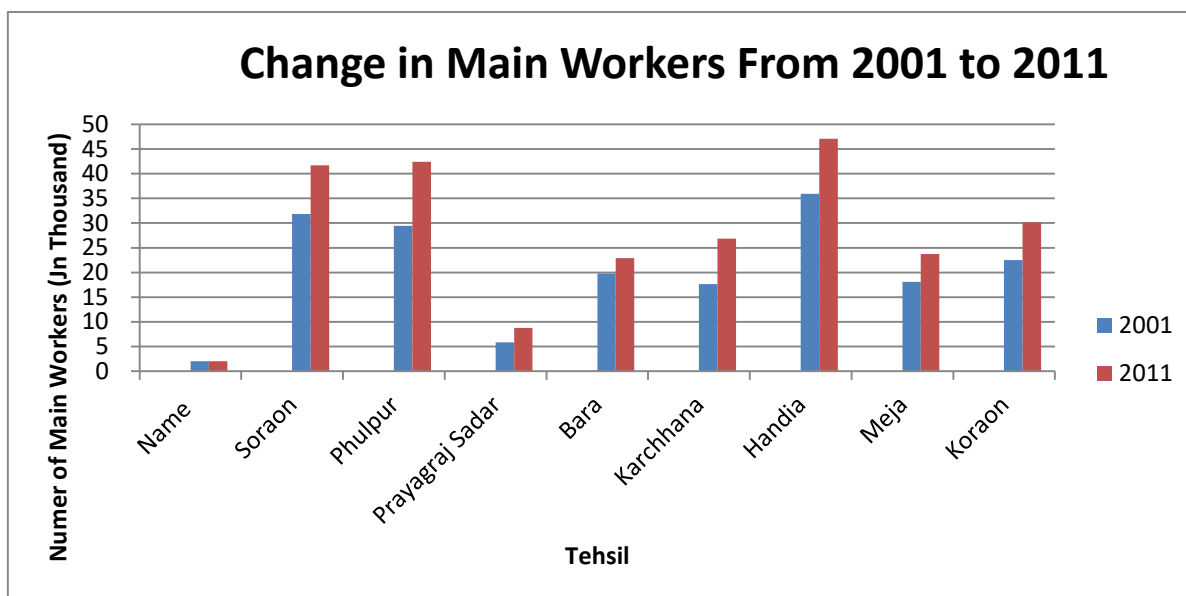


Fig.2

The table shows the spatial variation of female workers in different areas of Prayagraj district between 2001 and 2011. It shows that the number of female workers increased in all eight areas during this period. Prayagraj Sadar recorded the highest increase (33.64%), followed by Bara (27.53%) and Koraon (24.48%). Phulpur also showed a significant increase of 18.78%, while Handia increased by 17.59%. Soraon and Karchhana had moderate increases of 14.20% and 14.51%, respectively. Meja recorded the lowest increase at 5.44%. Overall, the table indicates that female participation in work increased across all the selected areas from 2001 to 2011.

6.3 Change in Marginal Workers

Table 3: Change in Marginal Female Workers 2001 to 2011

Sr. No.	Name	2001	2011	CHANGE (%)
1.	Soraon	56869	59607	4.81
2.	Phulpur	58976	62636	6.21
3.	Prayagraj Sadar	6604	7817	18.37
4.	Bara	15673	22312	42.36
5.	Karchhana	32072	30061	-6.27
6.	Handia	71258	78974	10.83
7.	Meja	37308	34689	-7.02
8.	Koraon	26421	30748	16.38
	Total	305181	326844	

Source: Census of India

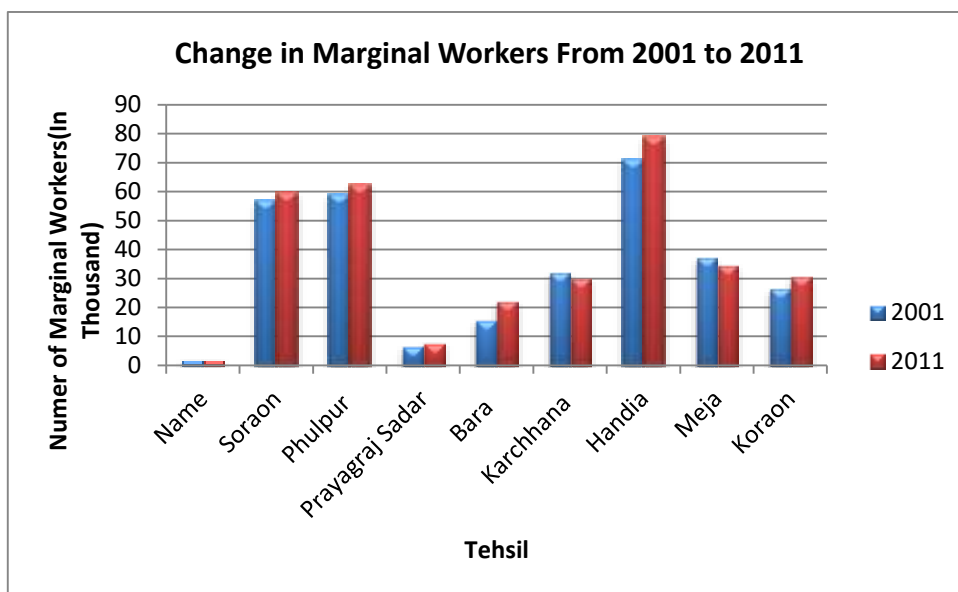


Fig. 3

The table 3 shows the change in the number of main workers in eight areas of Prayagraj district between 2001 and 2011. The number of main workers increased in all the areas during this period. Karchhana recorded the highest increase of 52.36%, followed by Prayagraj with 51.01% and Phulpur with 43.97%. Koraon, Meja, Handia and Soraon also showed increases of 33.99%, 31.07%, 30.98% and 30.96%, respectively. Bara had the lowest increase of 15.76%. Overall, the table shows that the number of main workers increased in all the selected areas from 2001 to 2011, indicating an improvement in employment participation.

6.4 Change in Occupational Structure of Rural Female Workers

Table No.4 Change in Occupational Structure of Rural Female Workers from 2001 to 2011

Sr. No.	Tehsil	Change from 2001 to 2011 (%)			
		Cultivators (CL)	Agri. Laborers (AL)	Household	Others
1.	Soraon	-63.97%	-18.00%	+113.64%	+174.29%
2.	Phulpur	-61.64%	-1.97%	+12.70%	+172.53%
3.	Prayagraj Sadar	-70.43%	-43.20%	+37.39%	+283.69%
4.	Bara	-62.91%	+10.99%	+39.18%	+58.33%
5.	Karchhana	-67.57%	-30.47%	+7.36%	+113.20%
6.	Handia	-61.47%	-0.19%	-8.66%	+249.60%
7.	Meja	-74.72%	-27.60%	+19.86%	+302.63%
8.	Koraon	-52.61%	+11.08%	+36.50%	+137.84%

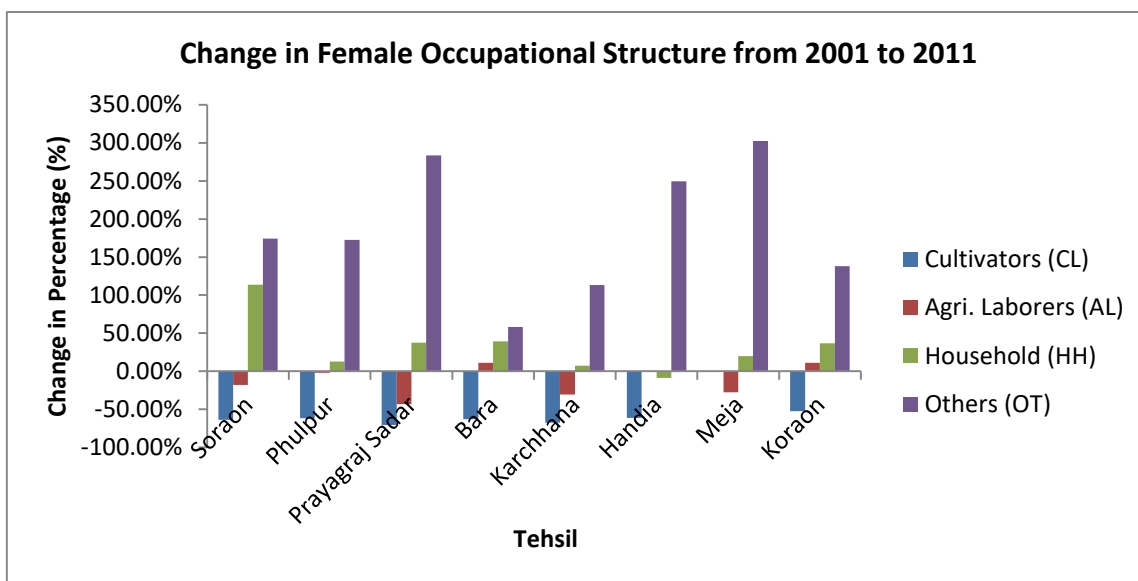


Fig. 4

The table shows the change in the occupational structure of female workers from 2001 to 2011 in eight tehsils of Prayagraj district. The most important change is the large decline in the share/number of female cultivators in every tehsil. The decline was highest in Meja (74.72%), followed by Prayagraj (70.43%) and Karchhaha (67.57%). This may be due to agricultural mechanization, reduction in agricultural dependence, land fragmentation, and movement of workers towards non-agricultural activities. Agricultural laborers also decreased in most tehsils, especially in Prayagraj (43.20%), while Bara and Koraon recorded small increases of about 11%. Household work increased in most areas, with the highest rise in Soraon (113.64%); however, it declined by 8.66% in Handia. The “Others” category increased sharply in all tehsils, with the highest increase in Meja (302.63%), followed by Prayagraj (283.69%) and Handia (249.60%). This rise may be related to better education, growth of towns and services, improved transport, and increasing opportunities for female in non-agricultural occupations. Overall, the table indicates a shift of female workers from traditional agricultural activities towards household and especially non-agricultural occupations between 2001 and 2011.

6.5 Change in Literacy

Table 5: Change in Total Rural Female Literacy from 2001 to 2011 across 8 tehsils of Pryagraj District

Sr. No.	Name	2001	2011	Change in literacy	Change in Literacy (%)
1.	Soraon	98250	175026	76776	78.14
2.	Phulpur	96432	182791	86359	89.55
3.	Prayagraj Sadar	19649	35773	16124	82.06
4.	Bara	40078	72867	32789	81.81
5.	Karchhaha	72769	126451	53682	73.77
6.	Handia	107620	207524	99904	92.83
7.	Meja	62113	124581	62468	100.57
8.	Koraon	32205	72823	40618	126.12

Source: Census of India

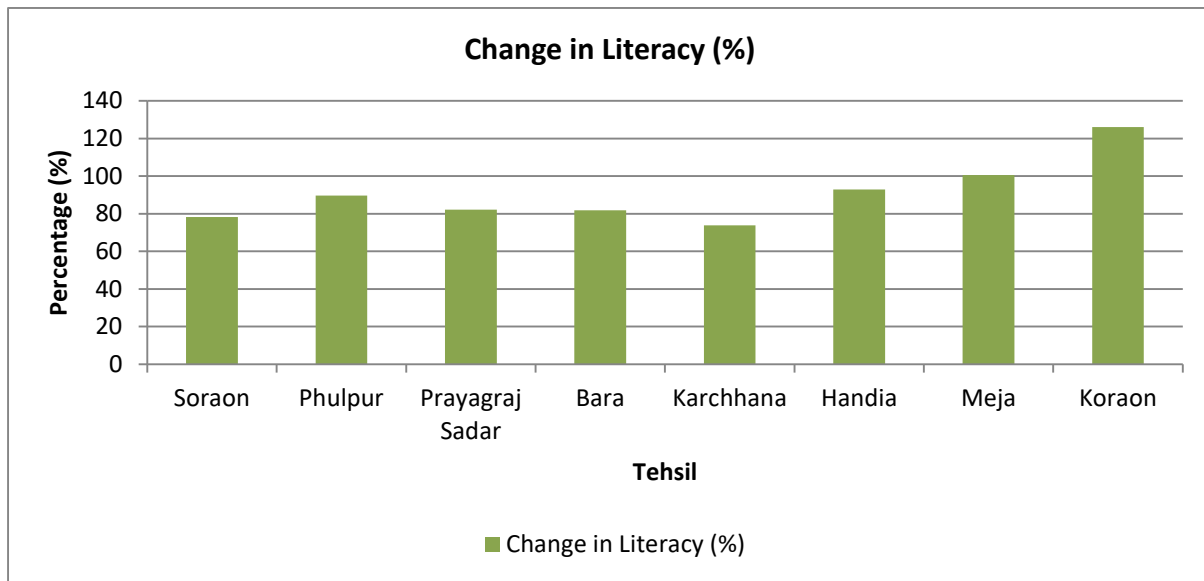


Fig. 5

The table shows the change in total rural female literacy from 2001 to 2011 in eight tehsils of Prayagraj district. Literacy increased in all the tehsils during this period. Koraon recorded the highest change in literacy (126.12%), followed by Meja (100.57%) and Phulpur (89.55%). Handia also showed a high increase of 92.83%, while Prayagraj and Bara recorded 82.06% and 81.81%, respectively. Karchhana had the lowest change at 73.77%, followed by Soraon at 78.14%. The improvement in literacy may be due to the expansion of schools, better access to education, government literacy programmes, increased awareness about education, improved transport and communication, and greater participation of girls and female in education. Overall, the table indicates that literacy improved considerably across all eight tehsils between 2001 and 2011, with the increase being particularly high in relatively less-developed areas such as Koraon and Meja.

7. Discussion

This study looked at the spatial pattern of rural female's involvement in the workforce in the eight tehsils of Prayagraj district between the years of the two Censuses, 2001 and 2011. The results show a significant but uneven rise in female's participation in the district. In each of the tehsils, female workforce participation went up, with Prayagraj Sadar showing the greatest increase, then Bara and Koraon. On the other hand, Meja and Karchhana displayed comparatively smaller growth, which indicates that they still rely mainly on agriculture and have few opportunities for non-farm employment. Even though Prayagraj Sadar had the highest percentage increase, Handia was still the biggest contributor to the female workforce in absolute numbers, underscoring the need to consider percentage changes in light of the total population size.

A significant observation is the rise in the number of female engaged as main workers in all the tehsils, showing a steady move towards more regular and continuous employment. The tehsils of Karchhana, Prayagraj Sadar and Phulpur showed the highest rate of growth in main workers, pointing to an improvement in employment stability. Yet the situation regarding marginal workers was mixed. Although most tehsils saw an increase in the number of marginal workers, Meja and Karchhana witnessed a decrease, which might mean that some female have moved from seasonal or irregular work into more permanent employment. On the other hand, the ongoing increase in marginal workers in a

number of tehsils implies that underemployment and work on a seasonal basis still play a major role in rural female's livelihoods.

The study also points out a significant structural change in the employment of female. The number of female cultivators dropped markedly in every tehsil, together with a decrease in agricultural labourers in most regions. This corresponds to wider changes taking place in rural India, such as the introduction of agricultural machinery, the fragmentation of landholdings and the decreasing profitability of small-scale farming. Yet at the same time there was a substantial increase in employment in household industries, especially in the non-agricultural 'Others' category, in all the tehsils. The quick growth of non-farm employment shows that rural female are increasingly diversifying their sources of income beyond agriculture, even in rather remote tehsils like Meja and Koraon.

A major finding is the considerable increase in female literacy between 2001 and 2011; the greatest gain in literacy was seen in Koraon and Meja, after which came Handia and Phulpur. In these tehsils there were also notable rises in non-agricultural employment and marked reductions in the number of cultivators, indicating a positive link between education and occupational diversification.

The analysis also shows large differences in terms of space among the eight tehsils. Prayagraj Sadar had a particular pattern of employment, marked by fast growth in the workforce and a greater diversification into non-farm activities, a result of urbanization. On the other hand, the more rural tehsils maintained larger numbers of female in employment but saw a slower structural change. These variations show how important it is to carry out an analysis at the tehsil level, since the average figures at the district level hide important local differences.

8. Conclusion

The study is mainly based on secondary data collected from the Census of India for the years 2001 and 2011. The Census provides useful information on female workforce participation and helps in understanding the changes and spatial differences in rural areas. It was found that in all the tehsils the level of female's participation in the workforce rose, though the rate of increase differed greatly. The highest rates of growth were seen in Prayagraj Sadar, Bara and Koraon, while Handia still had the largest number of females in the workforce in absolute terms.

The study also showed significant changes in the way female were employed. The number of main workers rose in every tehsil, showing that employment had become more stable, and the type of work had shifted from agriculture to household industries and non-agricultural activities. Female literacy improved greatly all over the district, especially in Koraon and Meja, which indicates that education has helped female to have access to a variety of sources of income. Moreover, the results point to considerable spatial disparities and show why a tehsil-level analysis is important when looking at regional differences.

Throughout the decade there was an increasing yet uneven level of rural female's involvement in the workforce, together with a steady shift towards more regular and diversified forms of employment. The study stresses the importance of having policies which are tailored to each location and that aim at improving female's education, promoting their skill development, expanding opportunities for non-farm employment and enhancing social protection, and future research should make use of primary data and more recent datasets in order to examine the changing patterns of rural female's work.

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