

Paid Work, Housework, and Leisure among Men and Women: Insights from Indian Villages

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Abstract

In rural India, most of the men and women work in the informal sector with flexible allocation for paid work, self-employment, home/care work and leisure. The paper examined time allocative behaviour of 1260 sample households from 18 selected villages of India for the year 2014, with the objectives of assessing the allocation of time among paid work, self-employment, homework (domestic chores) and leisure. The paper uses high-frequency data and measured hours spent weekly in the above activities and applied econometric techniques to know the factors behind time allocation among different activities for both men and women. Total hours spent on paid work and self-employment in rural India is low, showing underemployment. Overall, men spent 37 hours per week in market activities (both paid and self-employment together), whereas women spent 28 hours per week. Both men and women work more hours in self-employment than paid work. However, paid work hours were more among men (12.6 hours) compared to women (7 hours). Women spent more (42 hours) in home/care work compared to men (only 21 hours). Leisure was a little higher among men compared to women. The results shows that, the time spent on market work(paid and self-employed), home/care (domestic chores) and leisure vary significantly with the caste status, household wealth, land, income, education, skill, having older parents/grandparents in house, number of children and linkages with urban areas. Illiterate women were more loaded with low-wage paid-work as casual labourer and also home/ care work with very little time on leisure. Some of the policy prescriptions from the study are (i) enhancing the ownership of assets like land, irrigated area through providing credit to increase hours worked in self-employment among women, (ii) imbibing savings habit through women self-help groups to increase women work hours in market -related works(both paid and self-employment), (iii) higher educated (above higher-secondary) women and men were working more hours in market-related work by taking advantage of growing employment in service sector and new emerging occupations like repair of mobiles, electric motors computer centres (ii) imparting skill development in both traditional caste occupations and also in modern sectors helped both men and women to increase market related work and (iii) market-related works are more for the villagers who are linked to urban areas either through relatives or friends.

Keywords: Employment, Occupation, home/care work, paid work, wage level and structure, wage differentials, agricultural labour markets, Time Allocation, work arrangements

1. Introduction

Over the past two decades, India has emerged as one of the fast-growing economies in the world with far-reaching changes in its rural economy as much as in the overall economy. Of all the emerging economies, India remains predominantly rural with about seventy percent of its population and about sixty-five percent of its workforce still working and living in rural areas. Rural labour markets are segmented based on social groups, gender, caste and class hierarchies, but in the recent years there is increased dynamism and movements in the labour markets based on education, skills and due to non-farm employment opportunities (Reddy, 2006; Reddy, 2011; Reddy, 2014; Psacharopoulos and Arriagada,(1986); Reddy et al., 2014a; Reddy et al., 2014b; Reddy et al., 2014c; Reddy et al., 2014d; Reddy et al., 2016). Labour markets changed over the year significantly in terms of an increase in non-farm employment, especially among males. Even though the share of non-farm sector in GDP is increasing at a faster rate, the labour movement from farm sector to non-farm sector is at a

much slower rate. Historical data (1973–1993) of India suggests that while there has been an overall decline in farm–non-farm employment ratio over the entire period, it has shown an increasing trend in some states from the second half of the 1980s and also shows strong tendency to converge over time to the level of Kerala, the leading state in the initial period (Mukherjee & Kuroda, 2002). Most of the men and women work in informal sector with flexible allocation for paid work, self-employment, home/care work, and leisure. The international evidence indicates that paid-work as well as wage rates increase with education in the informal sector. For example, in Camaron, the average wage per level of education is as follows: no education 50.56 dollars; primary education 65.28 dollars; lower secondary education 95.68 dollars; upper secondary education 161 dollars and tertiary education 330.36 dollars per month(Henri, 2018). For the male workers, the labour supply curve mostly depicts a negative slope for greater responsiveness to the income effect than substitution effect whereas, for females substitution effect works stronger than the income effect and hence depicts a forward bending curve. For women leisure is not a perfect substitute for work as participation in unpaid home/care work constitutes a huge chunk of the time supposedly considered to be devoted to leisure (Kanjilal, S, 2016). A study based on Labour Bureau Survey of Pakistan by Shahnaz, *et.al* (2008) mentioned that at a micro level the questions relate to vulnerability, ‘hidden underemployment’ in terms of hours of work, measuring the productivity and contribution to income and/or consumption of unpaid family workers within household economy and socio-demographic household determinants of entry into this specific employment status.

The general theory of choice in neo-classical economics views the decision of a woman to participate in the labour force as a choice between work and leisure which is influenced by changes in wage rate. A change in wage rate produces two effects on labour supply. The ‘substitution effect’, produces more work because it raises the cost of leisure relative to work. The other, called ‘income effect’ produces less work because it increases purchasing power. Generally, for men as well as for single women, income effect was supposed to outweigh substitution effect. As work within home does not constitute their major activity, their choice was narrowed down to either market work or leisure. But this theory was criticised mainly for its limited application (Sweet, 1973). After that, Layard and Mincer (1985) promoted a new era of economics: “Economics of the Family”. According to their theory, fertility and labor supply decision of married women are jointly determined by the wife’s price of time, other sources of household income, and relative prices. A study by Lee *et.al* (2008) mentioned that marriage remains a major obstacle to young women's employment in some countries like Korea and further investigation into the participation patterns among married women reveals that labor force participation rate (LFPR) varies with husband's occupation and her own age. Lower LFPR among the young married women is explained by demand-side factors, while relatively higher LFPR among the middle-aged married women is mostly explained by the supply-side factors. Majumder (2011) in his study on Indian rural labor market has shown that the push factors are stronger at the lower end of the spectrum while pull factors and the opportunity cost of not working are stronger at the upper ends.

In the context of economic development and female participation, Boserup (1970) has emphasised the role of “Division of Labor in Family Production”. She mentioned that in the rural areas where production is predominantly performed for consumption in the family; there is a division of labor by sex and age. Among these factors, the importance of education in terms of human capital investment in women was first addressed by Schultz (1985) followed by Becker (1964). According to their version of the human capital model, education and training would improve workers’ skills, enabling them to work in different economic sectors and to earn more.

Household economics, an extension of neo-classical economics, initiated by economists such as Jacob Mincer (1962), Becker (1965), G. C. Cain (1966), and R. Gronau (1977) tried to explain female labour force participation in terms of household characteristics. Mincer (1962) attempted to answer the question with the focus on the supply characteristics of married women. He argued that the decision whether the wife should enter the paid labour force or not could involve not only the income and substitution effects of market work versus leisure but also the income and substitution effect of market versus unpaid house/care work. Research work like Becker (1965) elaborated on the basic economic theory of the household. Their theory rests upon the assumption that the household is a consumer as well as decision-making unit. The decision-making process is aimed at maximising the well-being of the household which is constrained by time and financial resources. Thus, the household faces the problem of allocating time between market work and leisure.

While labor supply and wage determination model gives a demand-supply framework of labor market, it nearly assumes that the market is perfectly competitive. But in reality, the labor market is extremely segmented. There is a fundamental duality within the informal sector, whereby some people work in a lower tier because they can do no better, while others work in an upper tier into which entry is restricted because of human capital and financial capital requirements (Fields, 1990). Krugman and Obstfeld (2003) proposed an integrated labour market model, starting with two or more sectors but assuming that all of the equilibrating forces that apply to a single labour market with market clearing also apply to a labour market with a multiplicity of sectors, so that wages equalize across sectors (Harris and Todaro, 1970). The labor market in developing countries consists of a small number of labor market segments or sectors linked to one another by actual or potential mobility of workers and or firms (Dixit, 1973; Basu, 1997; Fields, 2007). A comparative study between Vietnam and India by Imai, *et.al.* (2015) showed that the access to the rural non-farm employment significantly reduces vulnerability too in both countries, implying that diversification of household activities into non-farm sector would reduce such risks and the poverty and vulnerability reducing effects are much larger for sales, professionals, and clerks than for unskilled or manual employment in both countries.

An ILO study found that “in most economies, women still earn 90 percent or less of what their male co-workers earn” (ILO, 2007). It is therefore required to put together these various segments into one model, as conditions in one segment affect and are affected by conditions in other segments. In the context of economic development, the path-breaking work on multi-sector labor market models was done by Lewis (1954) and

Kuznets (1955). Lewis and Kuznets showed that economic growth is marked by the gradual shift of workers out of the lower paying segments and into the higher paying ones. They mentioned that the main development problem is not unemployment but rather low incomes in the poorer parts of the economy. It has also been argued that the same worker would earn quite different amounts depending on where he or she is located.

In the context explained above, this paper takes up specific research questions in following sequence:

- To assess the labour supply and its determining factors in various economic and non-economic activities in rural India
- To examine the influence of different socioeconomic and personal characteristics of workers on men's and women's wage rates
- To examine the determinants of labour market segmentation in different occupations.

2. Data

The data used in this paper were obtained from a larger research project entitled “Village dynamics studies in South Asia”. Under the project, a research team from the International Crops Research Institute for the Semi-arid Tropics collected a range of data from households in 18 selected villages in 5 states (Andhra Pradesh, Maharashtra, Madhya Pradesh, Gujarat and Karnataka). Those villages represented broad agro-climatic sub-regions in the semi-arid tropics of India. The data were collected with every 15-day interval by the residence field investigators through personal interview with every person in the selected household located in each village by using standard questionnaire, mainly employment schedule of Village Dynamics Studies in South Asia. The questionnaire and data collection methods along with the data are available at <http://vdsa.icrisat.ac.in>.

The sample households were selected based on the stratified random sampling method to represent the landless (owning 0.0–0.1 ha), small-scale farmers (with 0.1–1.0 ha), medium-scale farmers (with 1.01–2.0 ha) and large-scale farmers (with more than 2 ha) in proportion to the total population in each village.

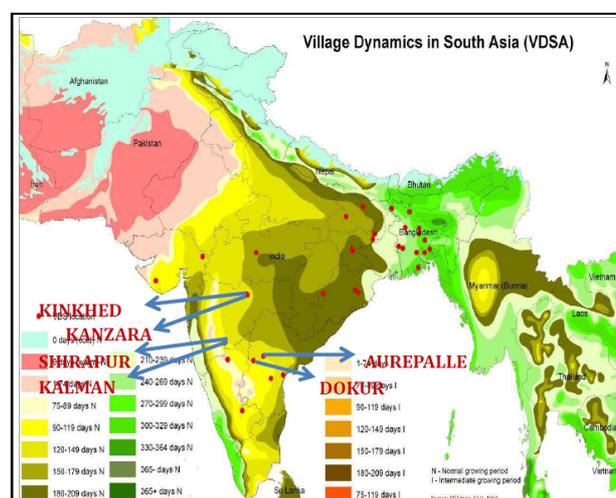


Figure 1. Map of Study Villages of Semi-Arid Region of India

Source: Village Dynamics in South Asia database.

All individuals between 15 and 65 years of age were selected for the study. A historical data from 1975 to 2010 for 6 villages- two from Telengana, namely, Aurepalle and Dokur of Mahabubnagar district and four from Maharashtra- Kalman and Shirapur from Solapur district and Kinkhed and Kanzara of Akola district are used in this study to understand the trends Over the years (Figure 1). Along with that, to understand the time allocative behaviour, 1260 sample households from 18 selected villages of India for the year 2014 have examined with the objectives of assessing the allocation of time among paid work, self-employment, home/care work (domestic chores) and leisure. To take advantage of the high frequency of the data, variations in hours worked and in wage earnings by sex, level of education, economic activity (self-employed in agriculture, rearing livestock, self-employed in non-agricultural work) and non-economic activity (domestic/care duties) were analysed. The paper also examines the segmentation of labour among major occupations (based on time spent on activities in 2014), namely: (a) self-employed in agriculture; (b) non-farm labour; (c) rearing livestock; (d) regular employment (receiving a monthly salary); (e) attending educational institutions; (f) attending to household domestic duties; (g) small business work; and (h) farm labour.

3. Methodology

The basic methodology broadly consists of Labour supply model, Mincerian wage model and Multinomial regression models.

(a) Labour supply model

The data were collected at a high frequency for one year to record the number of hours spent on each economic and non-economic activity. The data were collected for each day of the year; hence, there is a record for 365 days. The economic activities are: (a) paid work (farm and non-farm, with a wage rate); (b) self-employed in agriculture (c) rearing livestock; and (d) self-employed in non-agricultural work (for example, having a small business, such as making textiles). The non-economic activities are: (a) attending to domestic/care duties (such as cleaning utensils, washing clothes, cooking and preparing children for school); (b) being seriously ill; and (c) being unemployed. For analytical purposes, we have first calculated number of hours worked by both men and women in a year and then divided by 52 to arrive at hours spent per week in different activities.

The analysis of the data included frequency analysis, cross-tabulations with chi-square tests, and means analysis by using t-test at 5 percent level of significance. The labour supply model is given below-

Specification of the model

$$\dots\dots\dots (1)$$

Where

Y = Days Worked Per Month (**Dependent Variable**)

- = Wage rate (Rs/day)*¹
- = Farm size (acre)
- = Irrigated area (acre)
- = Value of assets (Rs.1000)
- = Caste dummies (OBC comparison group)
- = Religion dummies (Muslims comparison group)
- = Gender (0-women, 1-men)
- = Years of schooling
- = Experience (age-years of schooling-5)
- = Square Experience
- = Arm circumference (cm)
- = Random Error Term

The independent variables used in the regressions and the rationale for inclusion is explained in table 1.

Variable	Rationale for inclusion
Hours worked per year	Measuring supply of labour
Wage rate(Rs/day)	Returns of work
Farm size (acre)	Indicator for physical capital, source of employment on own farm
Irrigated area (acre)	Indicator for land productivity
Value of assets (Rs.1000)	Economic status of households
Caste dummies	Indicator of social discrimination
Backward caste	(reference group)
Scheduled tribe	
Scheduled caste	
Forward caste	
Religion dummies	Discrimination based on religion
Muslims	(reference group)
Christian	Christian's
Hindu	Majority
Gender (0-women, 1-men)	Gender discrimination
Years of schooling	Human capital through education
Experience (age-years of schooling-5)	Human capital through experience
Arm circumference (cm)	Physical capacity to work

Table 1: Independent variables included in the model

(b) Mincer equation

The modified Mincer equation was used only for workers who were engaged in paid work, as the wage rates data were available for this category only. Paid work includes both farm work and non-farm work. Given the absence of labour productivity data in rural India, actual wage rates were used as a proxy for labour productivity. In the modified Mincer equation, the log of wage rates per day was used as the dependent variable with the set of explanatory variables including (i) Farm size (acre); (ii) Irrigated area (acre); (iii) Value of assets (Rs.1000); (iv) Caste dummies (OBC comparison group); (v) Religion dummies (Muslims comparison group);

¹Note: Rs () represents rupees (US\$ 1 = about 70)

(vi) Years of schooling; (vii) Experience; (viii) Square Experience and (ix) Main occupation (own farm work as reference category).

(c) Multinomial regression analysis

The general form of Multinomial Logit model is:

$$\dots\dots\dots(2)$$

Where U_{ij} is the i th individual's utility of the j th choice, and X_i is a vector of values of the i th individual on the independent variables. The model estimates a set of regression coefficients for each of the alternatives (except for the choice option that has been defined as reference category), hence the subscript i .

There are eight major occupational categories, which are based on the time spent by the respondents on each activity: (a) self-employed in agriculture; (b) nonfarm labour; (c) rearing livestock; (d) regular employment; (e) attending educational institutions; (f) attending to household domestic duties; (g) small business work; and (g) farm labour. Multinomial regression analysis was used to analyse the choice of the occupation. The dependent variable was a categorical variable (occupational category, with eight categories) and it was regressed upon a set of independent variables. In the multinomial model, one occupational category (in this model, farm labour) out of eight categories of occupations was taken as the reference category.

(Occupational category) = f(physical capital of workers, human capital of workers, social group, personal and work-related variables, location-specific variables)

4. Results

4.1. Exploratory Analysis

4.1.1. Work day's male and female

The number of hours spent on economic activities (paid plus unpaid excluding house/care work) is lower during 1970s compared to late 2000s, especially for men. In both the periods, hours spent on economic activities are higher for males compared to females (figure 2). Over the period, number of activities (in non-farm sector and others) increased for both men and women, when compared to mid-1970s. In addition to this, the Favourable monsoon during 2004 to 2010 and employment guarantee act which was introduced during 2006 across India increased the demand for labour in the agriculture and allied activities, resulting in higher hours spent on economic activities among both men and women. The increase in economic activities for men started way back during 1978 and 1984, but for women it is still not picked up as that of men.

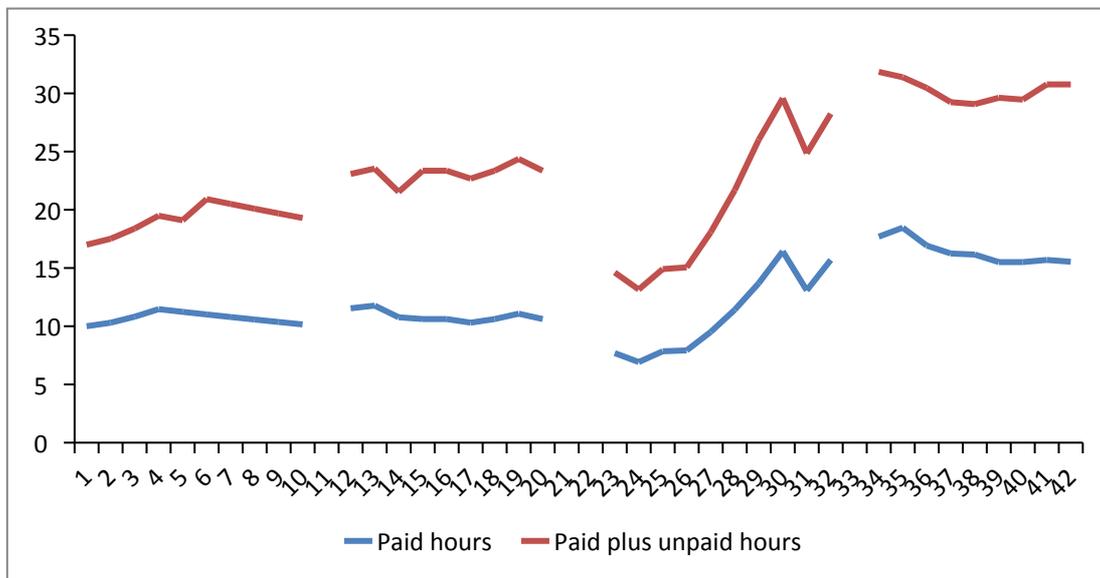


Figure 2. Hours spent on paid work and economic activities per week (paid plus unpaid)
 Source: Author's estimation from VDSA data

Figure 3 summarizes the work hours per week across gender including home/care/domestic work over the period 1975-2014. On average, the working hours are higher for females than males over the entire time span except during the early 1970s. Initially, in 1975, while females work for about 30 hours/week, males do have only about 25 hours/week. In a more recent time, 2006 to 2013, females have working days around 40 hours per week, while for males it ranges 32 to 34 hours per week.

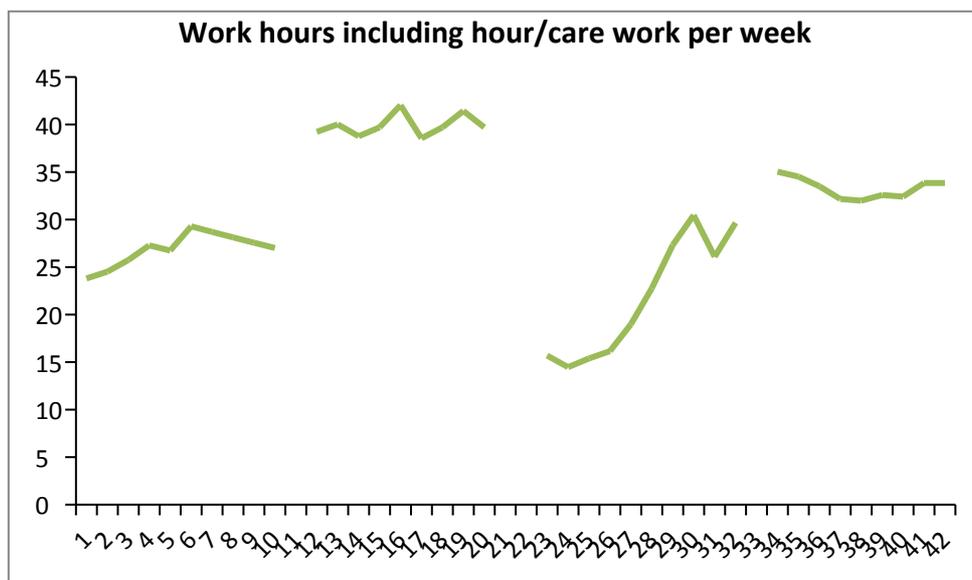


Figure 3. Work hours including home/care work (hours/week) (1975-2014)
 Source: Author's estimation from VDSA data

These higher female work hours in the rural areas can be coined as feminisation of work in rural India. Table 2 gives the list of activities and female concentration in these activities. 73 percent of the harvesting work is performed by females and they are spending their maximum time in harvesting (37 percent). The next maximum time allocation is in weeding (24 percent). The planting, threshing and fertilizer application work are mostly performed by female with minimum time allocation. Activities like irrigation, pesticide application, and

manure application are mostly done by male. The bottling up of labour in rural areas means that farm sizes will continue to decline, agriculture will continue its trend to feminisation, and part-time farming will become the dominant farm model. (Binswanger, 2013).

Type of work	% of time	Feminization
Harvesting	37	73 (machine harvesting by men)
Weeding	24	70
Irrigation	8	6
land preparation	8	22
Planting	5	60
Threshing	5	60
fertilizer application	2	73
Intercultural practice	2	1
pesticide application	1	12
manure application	1	33

Table 2: Type of activity and feminisation

Source: Author's estimation from VDSA data

4.1.2. Labour supply and earnings

In table 3, the number of hours the survey respondents spent on work (economic activities and attending domestic duties), being seriously ill and being unemployed, by sex, is shown. Men reported spending a total of 45 hours per week on the work listed, of which the greatest number of hours were spent as a paid worker (49 per cent), followed by self-employed in agriculture (20 per cent) and then domestic duties and rearing livestock (15 per cent each). The surveyed women reported spending a total of 51.2 hours per week on work, of which they spent the greatest number of hours on domestic duties (53 per cent), followed by paid work (25 per cent), self-employed in agriculture (10 per cent) and rearing livestock (10 per cent). Overall, men reported spending more hours on economic activities (85 per cent) than did women (only 47 per cent). If both economic (paid work and self-employment) and non-economic activities (domestic duties) are considered, women worked more hours than men. Regarding paid work, the average wage rate for women was only 12 per hour, while that of men was 25 per hour.

Work type /item	Female	Male	% over female
(I) Hours per week in economic activities	23.1	36.2*	56.7
Paid work	12.3	20.8*	69
Own farm	5.2	8.5	62
Own livestock	5.1	6.3	24
Own non-farm work	0.5	0.6	33
(II) Hours per week with non-economic activities (other)	28.1*	8.8	-68.7
Domestic duties	26.3*	6.5	-75
Seriously ill	0.9	0.6	-33
Unemployed	0.9	1.7	83
Hours per week with economic and non-economic activities (I+II)	51.2*	45.0	-12.1
Wage income (Rs /year)	7920	27000*	241
Wage rate (Rs/8-hour work day)	99	200*	102
Imputed income (all activities per annum)	32967	42551	29
Average level of education	5	8	

Table 3: Average number of hours per week spent on activities in 2014, women and men

Source: Author's estimation from VDSA data

Note: * indicates significant at 5% level by using t-test

Hence, the annual average income for women was only 7,920 compared with 27,000 for men. If the self-employed hours of men are imputed at 25 per hour, and of women at 12 per hour, the annual income gap between men and women is reduced from 241 per cent to 77 per cent. If the value of self-employed work and domestic duties is imputed at the average wage rate of women (at 12 per hour), then the gap between men's and women's imputed income is further reduced to 29.1 per cent. This indicates that, if the value of domestic duties of both men and women is imputed, the gap in annual incomes between men and women is drastically reduced from 241 per cent to just 29 per cent. These figures demonstrate that the number of hours spent on non-paid work, such as domestic duties and self-employment, was higher for women than for men. Women's lesser involvement in paid work is in part due to social barriers in rural society. However, the lower educational level of women (the average was only fifth standard) compared with that of men (the average was eighth standard) was one of the reasons for women's lower wage rates.

Sex	Type of work	paid hours per week	wage rate/day	paid wage income (Rs/annum)
Men	Non-farm	15.6*	222*	22 530*
	Farm	5.2	132	4 470
	Total	20.8	200	27 000
Women	Non-farm	5.1	107	3 550
	Farm	7.2*	94	4 363
	Total	12.3	99	7 920

Table 4. Average number of hours per week spent on activities and annual income in 2014, women and men

Note: * indicates significant at 5% level by using t-test

The time allocated to paid work was much lower in rural areas than in urban areas (see table 4). Men spent more hours on paid work than women did. Of the total hours spent on economic activities, men and women spent approximately 57.5 per cent and 53.2 per cent, respectively, on paid work. Significantly, this indicates that the remaining 42.5 per cent and 46.8 per cent were spent on self-employment activities by men and women, respectively. The higher proportion of self-employment activities (such as self-employment in agriculture, rearing livestock or small business activities) among women was also due to their greater involvement in livestock rearing activities.

4.1.3. Work-hours per week by level of education

Women spent fewer hours on paid farm work, with its lower wage rates, while men spent more hours on paid non-farm work at a comparatively higher wage rate, which is another indication of the segmentation of labour markets by sex (see table 5). Men's involvement in paid work increased as their level of education increased, up to middle-level education. Among women, paid work decreased as their level of education increased. This indicates that employment opportunities in paid work were higher for men with a middle-level education, but not for educated women. This is a reflection of the segmentation of labour based on sex in respect of education. It should be noted that, in rural areas, employment was available for only semi-skilled men, in such positions as

carpenters, repairmen in a two-wheeler/agricultural implement repair shop, electricians, bricklayers or cleaners. Women found it difficult to find paid employment appropriate to their higher education due to entry barriers in terms of social rigidities and traditions.

It also to be noted that the head of the household (mostly men) largely determined whether or not women participated in paid work. Educated women did not participate in casual paid work, as it is seen as inferior employment; heads of households viewed such work as adversely affecting the dignity of the household (see table 5).

Wage structures indicate that respondents with an education up to the intermediate level (12 years of education) did not have a significantly higher wage rate than those with less education, but there was a steep increase in wage rates for both men and women with an education above this level. The total reported work-hours, including for both economic and non-economic activities, are inversely related to education: in rural areas, respondents with a higher level of education had fewer work opportunities. This indicates that most rural employment is informal, inferior, not organized and semi-skilled, and it does not require higher education. People with a higher level of education prefer to be unemployed rather than to engage in inferior employment. In addition, the skill sets of educated rural youth do not match the local needs, and they lack the entrepreneurial skills required to start new businesses in rural areas. Recruiting local youth for such positions as teachers, nurses or health workers would reduce the poor conditions of the rural youth in India.

Sex/level of education	Economic activity					Non-economic activity	Other	Total hours per week (2014)
	Paid work	Self-employed in agriculture	Rearing livestock	Self-employed in non-agricultural work	Total	Domestic duties	Unemployed	
Men								
Illiterate	21.2	9.1	9.6	0.5	40.3	7.0	2.6	49.9
up to 5 years of schooling	21.3	9.2	8.2	0.5	39.3	6.8	2.0	48.1
12 years	19.2	7.5	3.4	0.8	30.8	5.2	1.1	37.2
Graduate or above	18.8	7.1	3.8	0.4	30.1	6.4	0.8	37.3
Total	20.5	8.5	6.2	0.5	35.7	6.7	1.8	44.2
Women								
Illiterate	16.0*	6.1*	6.6*	0.6	29.4*	23.8	1.1	54.3
up to 5 years of schooling	13.7	6.3	4.5	0.6	25.2	30.3*	1.2	56.7
11-12 years of schooling	7.5	4.0	2.8	0.4	14.7	24.1	0.0	38.8
Graduate or above	4.9	1.2	2.8	0.6	9.5	19.6	0.9	30.0
Total	12.1	5.0	5.0	0.5	22.6	25.7	1.0	49.3

Table 5: Work-hours per week by level of education, 2014

Note: * indicates significant at 5% level by using t-test

Traditionally, rural society has been divided on the basis of landholdings. Land is an important asset, and possessing land has a positive influence on employment opportunities, especially self-employment in agriculture, which in turn provides better wages and a higher socioeconomic status. The spill over spreads to the labour market, as the landless are discriminated against when they attempt to acquire skills or employment. Land ownership has a positive association with hours spent being self-employed in agriculture and rearing livestock, but it has a negative association with paid labour. It has a positive impact on wage rates, as it will raise reservation wage rates by increasing employment and earnings from the land owned and by enhancing bargaining power in the labour market. The ownership of irrigated land has similar effects on employment opportunities and wage rates.

4.1.4. Average work-hours per week by social group

In rural areas, it is not simply land ownership that is important, but whether the land is irrigated or not. If the land is irrigated, it is more productive and the owner's social status is improved, and employment opportunities are created. Irrigated land is also an indication of a higher household income. As was shown in the study, having irrigated land increases the number of hours spent on one's own farm, livestock and other domestic activities for both men and women, while simultaneously decreasing the number of hours spent on paid work. When working as paid labourers, those who possessed irrigated land received higher wages than those who did not possess irrigated land. This may be due to the fact that these workers might have been doing higher skilled work or they may have been working only when the local wage rates were higher, such as during the peak harvest season.

Among women, those from scheduled tribes reported working the most hours (paid work and self-employment), followed by those from scheduled castes, then women belonging to other backward classes and finally those from forward castes. It is interesting to see that the higher-educated forward caste women preferred not to work as paid workers, due to the stigma attached to involvement in paid work, and were mostly engaged in domestic duties, compared with lower caste women. Among men there is no clear trend. Overall, forward caste men and women worked fewer hours as paid workers, while scheduled caste men and women spent more hours on paid work (see table 6). Overall, in rural India, scheduled caste women and men work mostly as paid casual labourers.

Social group	Economic activity					Non-economic activity	Other	Average reported hours per week (2014)
	Paid work	Self-employed in agriculture	Rearing livestock	Self-employed in non-agricultural work	Total			
Caste group								
Other backward classes	21.2	8.3	6.4	0.5	36.4	6.9	1.8	45.1
Scheduled tribes	17.7	8.6	5.6	0.9	32.8	6.4	2.6	41.8

Scheduled castes	26.2*	3.9	4.4	0.4	34.9	5.7	1.7	42.3
Forward castes	18.4	11.6*	7.6	0.4	38.1*	5.8	0.4	44.3
Religious group								
Muslim	29.8*	10.2*	4.1	0.2	44.3	6.1	0.5	50.9
Christian	26.8	6.1	9.6	0.2	42.7	6.6	1.0	50.3
Hindu	20.6	8.5	6.2	0.4	35.7	6.7	1.8	44.2

Table 6. Average work-hours per week by social group (men), 2014

Note: * indicates significant at 5% level by using t-test

In India, about 80.5 per cent of the Indian population is Hindu; the rest belong to other religions, such as Islam or Christianity. It is a constitutional obligation to protect the interests of these minorities (Muslims, Christians and others). Many studies have reported that minorities, especially Muslim women, are at a disadvantage in the labour market. The results of the present survey showed that, overall, Muslim women spent fewer hours on economic activities compared with Hindu women. In 2014, the average number of work-hours spent on economic activities was higher for Muslim and Christian men compared with Hindu men. In general, there was less land ownership among the populations belonging to minority religions, and they depended mostly on a small business or on self-employment in non-farm occupations, such as tailoring or making textiles, for income. As expected, Muslim and Christian women worked more hours on domestic duties compared with Hindu women due to cultural restrictions (in the case of Muslims), and these households had less land (in the case of Christians). Hindu women worked more hours self-employed in agriculture and rearing livestock. There is a need to increase the participation of Muslim and Christian women in self-employment in agriculture through the distribution of government surplus land to these women for cultivation. The results show that workers belonging to minority communities (Muslims and Christians) and socially disadvantaged castes (especially scheduled castes and tribes) are to some extent constrained from entering into higher-wage economic activities.

	Self-employed in agriculture	Non-farm labour	Rearing livestock	Regular employment	Attending domestic duties	Small business	Farm labour	Total
Gender								
Men	40*	12	3	8	1	8	10	100
Women	29	3	11*	2	21*	2	21*	100
Education								
Illiterate	42	8	10*	1	9	2	25*	100
1-5 years of schooling	44	6	6	1	14	6	21	100
Graduate or above	15	1	1	22*	7	7	2	100
Landholdings								
Medium	45*	7	6	5	10	4	10	100
Large	51*	2	8	6	11	3	3	100
Landless	8	13	6	7	10	8	31*	100
Age group (years)								
15 to 24	17	10*	4	5	10	4	11	100
25 to 60	42*	7	8	6	10	6	18*	100
Caste group								
Scheduled castes	18	15*	4	8	9	5	28*	100
Forward castes	35*	3	7	7	20*	7	6	100
Total	35	8	7	5	11	5	15	100

Table 7. Distribution of individuals by main occupation (percentage)

Note: * indicates significant at 5% level by using chi-square-test

4.1.5. Occupational segmentation

In table 7, the respondents' main occupations are presented, based on the maximum number of days spent in the occupation for one year (2014). Of the 948 men between 15 and 65 years of age in the sample, 40 per cent were self-employed in agriculture, 14 per cent were attending educational institutions, 12 per cent were engaged in non-farm labour, 10 per cent were engaged in farm labour, 8 per cent were participating in regular employment (mostly government servants and salaried employees) and another 8 per cent were engaged in small business activities (such as tailoring or textile making), 3 per cent were involved in rearing livestock and another 3 per cent were engaged in a traditional caste occupation (such as a washer man or goldsmith), and only 1 per cent were engaged in domestic duties. This shows that self-employment in agriculture remains a major economic activity for men in villages, followed by non-farm labour and farm labour. It is interesting to see that a number of male members of the households (14 per cent) were attending higher education institutions.

Of the 631 women between 15 and 65 years of age in the sample, the main occupations were: self-employed in agriculture (29 per cent); attending to domestic duties (21 per cent); farm labourer (21 per cent); and rearing livestock (11 per cent). Farm labour and rearing livestock were the dominant activities among the illiterate, while literates were mostly self-employed in the agricultural sector. Although most non-farm labourers had received a middle-level education (6 to 8 years of schooling), the spread was up to 12 years of schooling. Many of the women with regular employment (monthly salaried) or engaged in small business work were educated up to the graduate level or above. Farm labourers and non-farm labourers were mostly landless and much younger than women who were self-employed in agriculture or engaged in domestic duties. Women with regular employment or engaged in small business work were mostly in middle age or old age. Women from scheduled castes were working mostly as farm labourers or non-farm labourers, although some were self-employed in agriculture. Respondents from scheduled tribes were mostly self-employed in agriculture, or engaged as farm labourers or in rearing livestock. The majority of female workers from other backward classes or from forward castes were self-employed in the agricultural sector. Caste occupations (traditional occupations such as making pottery or alcohol) had been dominant over the past 50 years, but recently they have been replaced by work in small businesses in modern sectors. Hence, caste occupations are merged with small business multinomial regression analysis to increase the sample size in each category and to keep the similarity in both occupations.

4.2. Estimation

4.2.1. Labour supply model (hours worked per year)

To know the determinants of labour supply (hours worked) for each economic activity (paid work, self-employed in agriculture, rearing livestock and self-employed in non-agricultural work, as well as the total), separate labour supply equations were used with total hours worked during the year 2014 as the dependent

variable. The results are presented in table 8. Both ordinary least squares and maximum likelihood estimates were used; however, only ordinary least squares results are presented, as both give similar results. The pseudo R² (which is an indicator of the goodness of fit of the model) ranges from 0.24 to 0.37 per cent, indicating that the explanatory variables included in the model explain approximately 24 to 37 per cent of the variation in the choice of occupation among the respondents.

The average respondent spent 1,499 hours on paid work, 267 hours self-employed in agriculture, 230 hours rearing livestock and 12 hours self-employed in non-agricultural work. The hours spent on total economic activities were 2,008. The labour supply for paid work was positively influenced by the wage rate. However, the labour supply to self-employment in agriculture and to rearing livestock did not significantly increase with an increase in the wage rate. Labour supply to self-employment in agriculture and to rearing livestock was positively influenced by farm size. A 1 acre increase in farm size increased self-employment in agriculture by 9.64 hours and rearing livestock by 3.56 hours during the year. Overall, an additional acre of land increased the time spent per worker on economic activities by 13.09 hours during the year. If the average household has 5 workers, a 1 acre increase in farm size would increase the number of hours spent on economic activities by 65 hours per annum per household after controlling for other factors. In recent years, farmers have replaced human labour with machines on irrigated agricultural land. The negative association between irrigation and labour supply may also be due to the wealth effect, as farmers with irrigated land earn more income from agriculture. A higher value of assets owned (other than land) had a negative influence on the number of hours spent on paid work, as people with greater assets shift to self-employment, such as rearing livestock or owning a business, which is a positive sign. More years of education had a significant negative influence on the number of hours spent on rearing livestock, as it is considered to be the most inferior type of work. Work experience (age minus the number of years of schooling) had a significant positive influence on hours spent on paid work and self-employed in agriculture, as most of the older and more experienced respondents stayed in the more traditional areas of self-employment in agriculture or paid work. The younger respondents were more likely to engage in non-agricultural work. Among the physical capability indicators, arm circumference and height had significant positive influences on hours spent on paid work and rearing livestock, as they require more manual work. Weight had a significant negative influence on rearing livestock, as such work requires bending the body, which may not be as easy for people of greater weight. Respondents from scheduled castes and scheduled tribes were positively associated with hours spent self-employed in non-agricultural work, but negatively associated with rearing livestock and total economic activities. Workers from scheduled castes spent fewer hours self-employed in agriculture and rearing livestock but more hours self-employed in non-agricultural work. Hindus were more likely to spend time rearing livestock, and Christians were less likely to spend time self-employed in agriculture compared with Muslims. Married respondents were more likely to spend greater time self-employed in agriculture than unmarried respondents, who could take up any activity. Men were more likely to spend more hours than women in all economic activities. The study aligns with the finding of (Verick, 2014) where it is mentioned that in rural India, it has been observed that an improvement in the household's economic position in

terms of access to land or income often leads to withdrawal of women from paid work outside the household farms or firms. The norms of the traditional caste hierarchy function towards restricting the mobility of women belonging to upper castes. The dimensions or factors affecting the decision and ability of women to engage in the labour market are mostly overlapping like class, caste, gender and religion.

	all economic activities
	Coefficients
Wage rate	-0.65*
Farm size	13.09***
Irrigated area	-34.65***
Value of other assets	1.42***
Borrowings	0.94***
Caste dummies (OBC comparison group)	
Scheduled tribes	-128.13***
Scheduled caste	-149.65***
Forward caste	-43.64
Religion dummies	
Other minority	78.82
Hindu	-123.71
Gender (male =1)	380.39***
Years of schooling	-17.57***
Experience	24.97***
Experience ²	-0.62***
Arm circumference	28.08***
Adjusted R2	0.27

Table 8. Determinants of hours spent on economic activities in 2014 (labour supply model)

Note: *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level

4.2.2. Mincer equation (labour market segmentation in wage rates)

A modified Mincer equation was estimated only for paid wage earners. The dependent variable is the wage rate per day in log form. The explanatory variables included in the model explained approximately 19 per cent of the variation in the wage rate among women and about 29 per cent of the variation among men as indicated from the adjusted R2. Women were mostly engaged as casual labourers in agriculture, in which the human, physical and social background of the workers had little impact on wage rates. By contrast, among men, educated workers with more assets or land, who belonged to forward castes or the Christian religion, or who, had a greater weight and arm circumference received significantly more wages per day compared with the other respondents. Male workers engaged in non-farm labour, regular employment or small business activities also received higher wage rates than those in the other occupational groups (see table 9). Generally, while women were engaged mostly in low-paying casual labour in the agricultural sector, men worked in various occupations, in which they received higher wage rates. Wages were even higher for workers with physical assets, although social background also played a significant role.

log of wage rates	women	men
	Coefficient	Coefficient
Farm size	-0.010	0.015***
Irrigated area	0.024	0.023*
Value of assets	0.001***	-0.002***
Caste dummies (OBC comparison group)		
Scheduled tribe	-0.092*	0.089
Scheduled caste	-0.018	-0.043
Forward caste	0.053	0.204***
Religion dummies (Muslim comparison group)		
Other minority	-0.085	0.428***
Hindu	0.065	0.173
Years of schooling	-0.016***	0.001
Experience	-0.005	0.024***
Experience ²	0.000	-0.001***
Main occupation		
Non-farm labour	0.029	0.135
Livestock rearing	0.120	-0.044
Regular employment	0.013	0.237
Domestic work	-0.089	0.097
Petty business	-0.115	0.351
farm labourer	0.046	0.037
Adj R2	0.34	0.45

Table 9. Determinants of the log of wage rates (modified Mincer equation), women and men

Note: *, significant at 10% level; **, significant at 5% level; ***, significant at 1% level

4.2.3. Occupational Segregation: Multinomial Regression Analysis

The results of the multinomial regression analysis of the workers are presented in table 10. The pseudo R2 is 0.30, indicating the explanatory variables included in the model explain the 30 per cent of variation in the occupational choice of the workers. The Relative Risk Ratio gives the value of $\exp(\beta)$. The probability to engage in self-employed in agriculture for the workers is increased by 10% with one additional acre of land. With increase in one acre of land, probability to be engaged in non-agricultural labours reduced by 20%. The probability of scheduled caste workers to be engaged in non-farm labour will be higher by 3.4 times compared to other backward caste workers. Probability to be engaged in livestock rearing will increase by 3.9 times with one acre increase in irrigated area. The probability to be in regular employment will increase by 330 % with one acre increase in irrigated area, by 50% with one year of schooling and by 30% with one additional year of experience. With one year of additional schooling increased the probability to be engaged in petty business increases by 20%, to be engaged in regular employment by 50% and to be engaged in domestic duties by 40%.

	Self-	Non-	Livestock	Regular	Attending	Petty	Farm
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	employed in agriculture	agricultural labour	rearing	employment	domestic duties	business	labour
	RRR	RRR	RRR	RRR	RRR	RRR	
Farm size	1.1*	0.8*	0.8	0.8	1.1	1.1	1.0
Irrigated area	1.2	1.9	3.9*	4.3*	1.0	0.8	1.0
Value of assets	1.0	1.0	1.0	1.0	1.0	1.0*	1.0
Caste dummies (OBC comparison group)							
Scheduled tribes	0.5*	0.3	1.7	1.0	0.4	0.0	1.0
Scheduled caste	0.6*	3.4*	0.3	4.4	0.8	0.6	1.0
Forward caste	1.4	0.0	2.5	4.7*	2.6*	1.3	1.0
Religion dummies (other religion comparison group)							
Hindu	3.8	0.4	8.0*	8.0*	0.3	0.1*	1.0
Years of schooling	1.1	1.1	1.0	1.5*	1.4*	1.2*	1.0
Experience	1.1	1.2	0.9	1.3*	0.9	1.0	1.0
Adj. R2	30.0						

Table 10. Determinants of respondents' main occupation (farm labour as the reference category)

Note: * indicates significance at 5% level

5. Conclusions and policy options

Historically in rural India, men participated mostly in economic activities, while women took part mostly in non-economic activities, such as domestic duties. Of the economic activities, men's participation in paid work was higher. As a result, there was a vast gap in monetary income between men and women, even though women worked more hours if both economic and non-economic activities are taken into account. The lower participation of women in paid work was mainly due to social rigidities (such as the caste system in India) rather than their lack of skills, education or physical capabilities. The segregation of the rural labour market by sex was particularly visible in rural labour markets in India, with men shifting to non-farm occupations with higher wage rates and women still depending on farm work (either self-employed or as casual labourers). The higher wage rates for men in non-farm occupations, women's greater involvement in the less-remunerative agricultural sector, the greater involvement of women in domestic duties, and higher unemployment among educated women are some of the indicators pointing to the discrimination against women in rural labour markets in India, which supports the segmented labour market theory. It is interesting to see that, in rural India, the number of hours spent on economic activities increases with an increase in land ownership and assets rather than with education. Levels of education and levels of work experience have little influence on the choice of occupation or the quality of employment, especially among women. Most employment continues to be found in such traditional areas as agriculture and to some extent in traditional caste occupations. Even most non-farm employment, such as that found in small businesses (self-employment), retail shops, agro-processing, the repair and maintenance of agricultural implements, transport and construction, requires only semi-skilled workers with little education. The quality of work was significantly better among only a small number of the respondents, namely more highly educated men and women with regular employment as, for example, teachers, nurses, record keepers or health workers. Most of the higher educated youth remained unemployed. Most of the

educated women were engaged in domestic duties due to both the lack of local employment opportunities and socio-cultural restrictions that prevent them from taking jobs in distant places. The traditional rural labour markets in India were highly segmented based on caste, sex and traditional occupations; however, these factors are slowly having less influence on labour market outcomes. The driving forces behind the changes have been the increase in employment opportunities for semi-skilled men with a middle level education, along with the development of the rural non-farm sector. Semi-skilled workers have gained employment and increased wages in emerging non-farm sectors, such as mobile telephones, electronics and computers, and in other occupations, such as tractor drivers. A few more highly educated respondents were also able to earn incomes in nearby urban areas by working in non-farm occupations, such as construction workers. The demand for certain traditional occupations, such as traditional toddy tapping (that is, producing alcohol from palm) and cleaning clothes, is increasing in towns; this work is done by rural men and women with a middle-level education.

Some of the policy prescriptions emerging from the present study call for the following: (a) enhancing the ownership of such assets as land and irrigated areas by providing loans, which would increase the number of hours that people living in rural areas spend on economic activities; (b) enhancing the skills and education of workers living in rural areas, so they can take advantage of growing employment opportunities in the services sector and emerging occupations, such as the repair of mobile telephones and electric motors, and work in computer centres; and (c) increasing women's empowerment by reducing social rigidities in order to enhance women's participation in economic activities, (d) Farm machinery in harvesting and weeding to improve women productivity rather than replace women in agriculture; (e) Skill and entrepreneur development with focus on middle educated rural youth; (f) Encouragement to small farmers to increase their off-farm income and employment opportunities; (g) Small farmers and agricultural labourers needs to be given easy loan coupled with skill training to earn additional income from non-farm activities.

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