

## RURAL LABOUR MARKETS: INSIGHTS FROM INDIAN VILLAGES

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*In this paper, labour market behaviour in rural India is examined, with the objectives of assessing the structure of the work status among sample individuals and of testing segmented labour market theory. Simple regression techniques and an estimated modified Mincer equation to determine earnings are used in the paper, followed by the application of multinomial regression analysis. Labour markets are segmented based on social background to some extent, which is in line with segmented labour market theory based on caste, sex and assets. Most of the more highly educated remain unemployed due to a lack of sufficient employment opportunities, even though higher education increases the probability of being engaged in regular employment. However, households invest heavily in children's education in the hope that they will obtain regular employment. Policies that promote asset ownership, household savings and skills development would increase people's chances of obtaining regular employment with higher earnings.*

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*Key words:* Labour economics, wage level and structure, wage differentials, agricultural labour markets.

### I. INTRODUCTION

The segmentation of labour markets has long been a subject of debate for labour and development economists. In his well-known survey, Cain (1976) summarized the challenges raised by the theories on segmented labour markets to the classical and neoclassical schools of labour economics, which go back until the

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end of the 1980s. He quoted John Stuart Mills as one of the first economists to acknowledge the segmentation of labour markets together with the existence of persistent wage differentials among different groups of workers. Many researchers have attempted to understand labour markets in developing countries in terms of segmentation.

Labour market segmentation can be characterized as a situation in which people working in some jobs experience differences in earnings, levels of employment protection and opportunities. To have labour market segmentation, however, this situation has to be “rigid”, that is, these differences must persist and it must be difficult for disadvantaged workers to move to “good” jobs or segments of the market. Thus, segmentation translates into dramatically different levels of vulnerability, which makes some individuals much more likely to end up in a state of poverty and deprivation than others, especially in less developed countries, as labour is the main source of income for most poor people in the developing world (Fields, 2006).

If labour markets are becoming more segmented, the increase in segmentation is likely to affect negatively the most vulnerable groups of workers. Women are one of these groups. In fact, research has shown that women tend to be more vulnerable than men, with lower participation rates and, even when they do enter the labour market, to earn less and to advance more slowly in their careers (Sundaram and Vanneman, 2008; Heath, 2012; Reddy and Kumar, 2011). It is also relevant for Indian rural labour markets, where discrimination in employment based on caste is prevalent. The social groups that had been discriminated against in the past are still disadvantaged in many socioeconomic areas including the labour market. Scheduled castes and scheduled tribes are two groups of historically disadvantaged people that are recognized in the Constitution of India. “Other backward classes” is a collective term used by the Government of India to classify castes with populations who are educationally and socially disadvantaged but who are better off than the scheduled caste and scheduled tribe populations. Forward castes are educationally and socially better off than others. Of the total population of India, scheduled castes comprise 16.6 per cent, scheduled tribes 8.6 per cent and other backward classes 52.0 per cent. The remaining 22.8 per cent belongs to forward castes. One of the main goals of planning in India is the socioeconomic development of the scheduled castes, scheduled tribes and other backward classes. However, there is a significant difference between scheduled castes and scheduled tribes: the populations of the former are mostly casual labourers, while those of the latter possess more land and are often self-employed in the agricultural sector.

There are very few studies on the analysis of caste and gender discrimination in rural labour markets in India. Although employment opportunities in highly productive, non-farm sectors in urban areas are increasing employment prospects for

the educated youth, the rural population has not been able to take advantage of such opportunities. Most rural employment remains in the informal sector, in low-productivity and low-paying jobs. Recently, however, there has been some dynamism in rural labour markets: there have been increases in rural-urban linkages and non-farm employment, and a higher share of the educated labour force is in rural labour markets. All of these changes have resulted in a higher rate of rural-urban migration of men and skilled workers (leaving behind women and unskilled workers in rural areas). In addition, the increase in demand for workers in the non-farm sector has raised wage rates in some occupations. At the same time, there have been technological changes in rural and agricultural sectors, farm mechanization has taken place, and social security programmes, such as the National Rural Employment Guarantee Act 2005, have been implemented.

Despite these changes, income and employment opportunities have increased for only a very few well-endowed workers, while a large proportion of the workforce has remained in low-productive, informal employment. The result is a widening gap in wage rates between the rural sector and the urban sector, and between agricultural and non-agricultural employment, which is in line with segmented labour market theory. Many rural, illiterate, unskilled and less-resourceful persons, especially those from socially disadvantaged groups (scheduled castes and scheduled tribes), are stuck in perpetual poverty. In general, poverty is higher in rural areas than in urban areas. The poverty level in rural India is 33.3 per cent. It is highest among farm labourers (49.4 per cent), followed by non-farm labourers (39.6 per cent), those self-employed in the non-agricultural sector (28 per cent), those self-employed in the agricultural sector (26.2 per cent) and those with regular employment<sup>1</sup> (14.4 per cent) (Krishna and Shariff, 2011). The wide disparities in the level of poverty in rural India are also an indication of the segmentation of labour markets.

Over the last decade, there has been a revival of research on informal employment and labour market segmentation in developing countries, generating a lively debate on the nature of informal employment. It has been suggested in many studies that occupational diversification has played a key role in reducing rural poverty since the early 1990s. In developing countries, the labour market consists of a small number of labour market segments or sectors linked to one another by the actual or potential mobility of workers or firms (Dixit, 1973; Basu, 1997; Fields, 2007). Different segments are required because some parts of the labour market operate in a qualitatively different manner than others. A study by Elder and Schmidt (2004) found that, "in most economies, women still earn 90 per cent or less of what their men co-workers earn".

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<sup>1</sup> Regular employees are those whose employment is close to permanent and who receive a monthly salary, unlike paid labourers, who work on a day-to-day basis.

It is necessary to have models that put together these various segments because conditions in one segment affect and are affected by conditions in other segments. Path-breaking work on multisectoral labour market models in the context of economic development was done by Lewis (1954) and Kuznets (1955), who showed that economic growth was marked by the gradual shift of workers out of the lower-paying segments into the higher-paying ones. They also concluded that the main development problem was not unemployment but rather low incomes in the poorer parts of the economy. They argued that the same worker would earn quite a different amount depending on where he or she was located.

With regard to human capital theory, which was developed by Schultz (1961) and Becker (1964), attempts were made to examine labour markets. 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. 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). Alternatively, the crowding model assumes that any worker who is not employed in the high-wage sector of the economy takes up employment in the low-wage sector of the economy; the Lewis and Kuznets models mentioned above can be considered crowding models. Finally, some models propose that workers choose occupations that maximize their current and future returns, but because of imperfect capital markets, occupations that require high levels of investment cannot be entered into by persons with low initial wealth. The distribution of workers across different occupations evolves over time as individuals invest their time and money in increasing their wealth or the wealth of their children (Banerjee and Newman, 1993).

Studies analysing microdata enable researchers to examine the different socioeconomic and cultural factors that determine the nature of employment. This type of data analysis is at the core of most contemporary research studies on labour markets, and the amount of literature using such data is correspondingly vast. However, these studies suffer from the limitations of a small sample, with only a small number of socioeconomic variables. They do not include nutrition- or health-related data and are focused on economic activities only, not on equally important non-economic activities such as domestic functions or education.

There is evidence of a high level of discrimination in wage rates and employment conditions against lower caste workers, women and landless labourers

in rural labour markets. Educated workers, higher caste workers and men receive favourable treatment in terms of wage rates and employment conditions. There are many socioeconomic constraints (such as a low asset base or a low level of skills) and other cultural restrictions (such as the caste system) that deter people in the lower socioeconomic strata from entering into higher paid jobs. Research on informal employment in developing countries has been very limited, above all because of a lack of appropriate data. There is a large gap in the literature on understanding rural labour markets through a holistic and multidisciplinary perspective, mostly due to the lack of individual-level data that would integrate the socioeconomic, nutritional and local factors. The present paper includes what is likely the first attempt to analyse jointly labour market segmentation and the gender wage gap in the context of a developing country. Using data collected from 18 villages in India, there is an attempt in the present paper to identify the work participation rate, wage rates and occupational structure among men and women and among different social groups in an effort to establish the extent to which the rural labour market is segmented by sex and social group.

This paper is focused on the following specific objectives:

- 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.

## **II. 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 subregions in the semi-arid tropics of India. The data were collected every 15 days by resident field investigators through personal interviews with each individual in the household in each village by using a standard questionnaire.<sup>2</sup>

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<sup>2</sup> With regard to the "Employment schedule of Village dynamics studies in South Asia" questionnaire, data collection methods and the data are available from <http://vdsa.icrisat.ac.in/>.

The sample households were selected based on the stratified random sampling method to represent the landless (owning 0.0 to 0.1 hectares), small-scale farmers (with 0.1 to 1.0 hectares), medium-scale farmers (with 1.01 to 2.0 hectares) and large-scale farmers (with more than 2 hectares) in proportion to the total population in each village. All individuals between 15 and 65 years of age were selected for the study. The present paper examines the labour supply, wage rates and occupational structure among 948 men and 631 women in the 18 villages in 2010. 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 duties) were analysed. The paper also examines the segmentation of labour among major occupations (based on time spent on activities in 2010), 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.

### **III. METHODOLOGY**

#### **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 duties (such as cleaning utensils, washing clothes, cooking and preparing children for school); (b) being seriously ill; and (c) being unemployed. Because information on the number of hours spent attending educational institutions was not available, this category has not been included here. To estimate the labour supply in each economic activity, four regressions were used, with the number of hours spent on each activity in 2010 as the dependent variable. After aggregating the hours spent on all economic activities, a pooled regression was also employed. The independent variables used in the regressions and the rationale for inclusion are explained in table 1. A simple regression equation was used after correcting the sample selection bias.

## 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 given in table 1 to determine the influence of human and physical capital and socioeconomic factors on the wage rates.

**Table 1. Explanatory variables included in the various regression analyses**

Variable	Rationale for inclusion	Average	Standard error	Labour supply	Mincer equation	Multinomial regression model
Hours worked per year		2 008	822.5	Dependent variable		
Wage rate (Rs/day)	To determine supply of labour	154.63	229.9	√	Dependent variable	
Farm size (acres)	Indicator for physical capital, source of employment on own farm	1.68	5.2	√	√	√
Irrigated area (acres)	Indicator for land productivity	0.58	2.51	√	√	√
Value of assets (Rs 1 000)	Economic status of households	24.57	64.9	√	√	√
Value of residence (Rs 1 000)	Long-run socioeconomic status of households	23.99	42.4	√	√	√
Borrowings (Rs 1 000)	Indicator of household needs	42.27	76.9	√	√	√
Caste dummies	Indicator of social discrimination			√	√	√
Other backward classes	(Reference group)	0.55	0.33	√	√	√
Scheduled tribes		0.12	0.33	√	√	√
Scheduled castes		0.17	0.38	√	√	√
Forward castes		0.16	0.37	√	√	√

Table 1. (continued)

Variable	Rationale for inclusion	Average	Standard error	Labour supply	Mincer equation	Multinomial regression model
Religion dummies	Discrimination based on religion			√	√	√
Muslims	(reference group)	0.08	0.18	√	√	√
Christians	Include Christians	0.10	0.17	√	√	√
Hindus	Majority	0.82	0.23	√	√	√
Marital status (0 = married, 1 = unmarried)	Household responsibilities	0.7	1.2	√		√
Sex (0 = women, 1 = men)	Gender discrimination	0.60	0.49	√		
Years of schooling	Human capital through education	5.67	4.9	√	√	√
Work experience	Human capital through experience	16.38	12.2	√	√	√
Age squared	To represent reduction in employment in old age	417.43	485.3	√	√	√
Height (cm)	Physical capacity to work	158.07	10.3	√	√	√
Weight (kg)	Physical capacity to work	51.36	11.2	√	√	√
Arm circumference (cm)	Physical capacity to work	23.97	3.7	√	√	√
Main occupation	Occupational choice			√	√	Dependent variable
Self-employed in agriculture	(Reference group)	0.32	0.34	√	√	
Non-farm labour		0.11	0.31	√	√	
Rearing livestock		0.02	0.15	√	√	
Regular employment		0.09	0.28	√	√	
Attending educational institutions		0.05	0.22	√	√	
Domestic duties		0.03	0.17	√	√	
Small business		0.12	0.33	√	√	
Farm labour		0.26	0.44	√	√	

Source: Village Dynamics in South Asia database.

Note: Rs (₹) represents rupees (US\$ 1 = about ₹ 60); 1 acre is equivalent to about 4,047 m<sup>3</sup>, or 0.4 hectares.



## Multinomial regression analysis

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) non-farm 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) with more than two categories (in this case, eight categories of occupations) 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 (Reddy and Kumar, 2006). This implies that parameter estimates for each category should be interpreted as indicators of the strength of the association of a particular explanatory variable with the respective category relative to the same explanatory variable with the reference category. Separate multinomial logit models were run for men and women.

## Model specification

The general form of a multinomial logit model is:

$$Y_{ij} = B_j X_i + U_{ij} \quad (1)$$

Where  $Y_{ij}$  is the  $i^{\text{th}}$  individual's utility of the  $j^{\text{th}}$  choice and  $X_i$  is a vector of values of the  $i^{\text{th}}$  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 the reference category); hence, the subscript in  $B_j$  (Decoster, 2009).

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

The independent variables included in the occupational choice model were the same as those listed in table 1. In the multinomial regression, "farm labour" was used as the reference category, as this category is the most prevalent type of occupation; historically, with economic development, workers tried to move out of this occupation to other occupations (Poterba and Summers, 1995; Lee, 1983; Boskin, 1974).

Multinomial logistic regression is used when the nominal response variable (dependent variable) has more than two categories. Multinomial logit models are multi-equation models. A categorical variable with  $k+1$  categories will generate  $k$  equations. Each of these  $k$  equations is a binary logistic regression comparing

a group with the reference group. Multinomial logistic regression simultaneously estimates the  $k$  logits. Furthermore, it displays coefficients only for the  $k$  categories. Thus, the coefficient  $\beta_j$  represents the log odds of being in the target groups relative to the reference group. Thus, a simplified multinomial logit model has the following form:

$$p_j = \frac{\exp(\beta_j X)}{\sum_j \exp(\beta_j X)} \quad \text{for } j = 1, \dots, k+1$$

$\exp(\beta_j X)$  stands for the exponential function and  $x$  is the vector of independent (or explanatory) variables.

$\beta_{k+1}$  can be set to 0 (zero vector) as a normalization and thus:

$$P_{k+1} = \frac{1}{\sum_j \exp(\beta_j X)}$$

As a result, the  $j$  logit has the following form:

$$\log \frac{P_j}{P_{k+1}} = \beta_j X \quad \text{for } j = 1, \dots, k$$

The slope coefficient represents the change in the log odds of being in the  $k$  category of employment versus the reference category with an increase in one unit of the independent variable. The significance of the parameter estimates can be determined through the usual  $t$ -test. However, the most common way of interpreting a logit is to convert it (log odd ratios) to an odds ratio using the exponential ( $\beta$ ) function – referred to from this point on as  $\exp(\beta)$ . The closer the odds ratio  $\exp(\beta)$  is to 1.0, the lesser is its influence in choosing between the  $k$  category of occupation versus the reference category, with 1.0 representing full statistical independence. For instance, if the odds ratio,  $\exp(\beta)$  is 2.0, when the independent variable increases by 1 unit, the odds that the dependent =  $k$  increases by a factor of 2.0 compared with the reference category (farm labour). The best-fit model is chosen based on the pseudo- $R^2$  for the multinomial regression.

## IV. RESULTS

### Labour supply and earnings

In table 2, 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 2,221 hours 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 2,569 hours 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. 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 are 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.

The time allocated to paid work was much lower in rural areas than in urban areas (see table 2). 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

**Table 2. Average number of hours spent on activities in 2010, women and men**

Variable	Women (average number of hours)	Men (average number of hours)	Percentage over women
(I) Economic activities (total)	1 201	1 882	56.7
Paid work	640	1 082	69
Self-employed in agriculture	270	442	62
Rearing livestock	265	328	24
Self-employed in non-agricultural work	26	31	33
(II) Non-economic activity (domestic duties)	1 368	338	-75
(III) Being seriously ill	47	31	-33
(IV) Unemployed	46	88	83
I+II (economic and non-economic activities)	2 569	2 220	<b>-13.61</b>
Wage income (₹/year)	7 920	27 000	241
Wage rate (₹/hour)	12	25	102
Imputed income ₹, if income from self-employment and domestic duties are imputed at ₹ 25 for men and ₹ 12 for women per hour	32 967	58 400	77
Imputed income ₹, if income from self-employment and domestic duties for both men and women are imputed at ₹ 12/hour	32 967	42 551	29.1
Average level of education (years)	5	8	

(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. 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 3).

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

**Table 3. Average number of paid hours, 2010, men and women**

Sex	Type of work	Average paid hours in 2010	Average wage rate/day (₹/8 hours)	Total average annual paid wage income (₹/annum)
Men	Non-farm	812	222	22 530
	Farm	271	132	4 470
	Total	1 082	200	27 000
Women	Non-farm	267	107	3 550
	Farm	373	94	4 363
	Total	640	99	7 920

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 should 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 4).

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 a 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 the 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.

Table 4. Work-hours and wage rates by level of education, 2010

Sex/level of education	Economic activity				Non-economic activity			Total hours (2010)	
	Paid work	Self-employed in agriculture	Rearing livestock	Self-employed in non-agricultural work	Total	Domestic duties	Being seriously ill		Others
<b>Men</b>									
Illiterate	1 100	473	499	26	2 098	365	26	134	2 623
Primary (up to 5 years of schooling)	1 110	478	427	26	2 041	355	26	103	2 525
Middle (6-8 years of schooling)	1 182	473	421	26	2 102	396	26	103	2 627
High (9-10 years of schooling)	1 059	421	267	46	1 793	308	21	87	2 209
Intermediate (11-12 years of schooling)	997	391	175	41	1 604	272	21	57	1 954
Graduate or above (more than 12 years of schooling)	977	370	195	21	1 563	334	21	41	1 959
Total	1 064	442	324	26	1 856	350	26	93	2 325
<b>Women</b>									
Illiterate	833	319	344	31	1 527	1 239	57	57	2 880
Primary (up to 5 years of schooling)	714	329	236	31	1 310	1 578	31	62	2 981
Middle (6-8 years of schooling)	535	293	242	26	1 096	1 470	51	51	2 668
High (9-10 years of schooling)	416	211	211	26	864	1 388	46	26	2 324
Intermediate (11-12 years of schooling)	391	206	144	21	762	1 254	41	0	2 057
Graduate or above (more than 12 years of schooling)	257	62	144	31	494	1 018	31	46	1 589
Total	627	262	262	26	1 177	1 336	51	51	2 615

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 provide better wages and a higher socioeconomic status. The spillovers spread 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.

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 5). Overall, in rural India, scheduled caste women and men work mostly as paid casual labourers.

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 2010, the average number of work-hours spent on economic

Table 5. Average work-hours by social group (men), 2010

Social group	Economic activity					Non-economic activity			Average reported hours (2010)
	Paid work	Self-employed in agriculture	Rearing livestock	Self-employed in non-agricultural work	Total	Domestic duties	Being seriously ill	Unemployed	
Caste group									
Other backward classes	1 100	433	334	26	1 893	360	26	94	2 372
Scheduled tribes	918	448	292	47	1 705	334	21	136	2 195
Scheduled castes	1 361	203	229	21	1 814	297	21	89	2 221
Forward castes	959	605	396	21	1 981	302	21	21	2 325
Religious group									
Muslim	1 549	532	214	10	2 305	318	26	26	2 675
Christian	1 392	318	501	10	2 221	344	26	52	2 643
Hindu	1 069	443	323	21	1 856	349	21	94	2 320



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.

### **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 2010 as the dependent variable. The results are presented in table 6. 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  $R^2$  (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 to 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 were 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

Table 6. Determinants of hours spent on different work categories in 2010 (labour supply model)

Explanatory variable	Paid work		Self-employed in agriculture		Rearing livestock		Self-employed in non-agricultural work		Total of all economic activities	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
Wage rate	<b>0.55</b>	<b>3.4</b>	0.01	0.2	-0.11	-1.2	<b>0.03</b>	<b>1.8</b>	<b>0.65</b>	<b>1.7</b>
Farm size	0.18	0.0	9.64	4.4	3.56	1.4	-0.30	-0.6	<b>13.09</b>	<b>2.6</b>
Irrigated area	-21.33	-1.5	4.39	0.7	-8.19	-1.0	-0.75	-0.5	<b>-34.65</b>	<b>-2.3</b>
Value of assets	-0.35	-1.0	<b>0.55</b>	<b>3.2</b>	<b>1.15</b>	<b>5.5</b>	<b>0.07</b>	<b>1.8</b>	<b>1.42</b>	<b>3.6</b>
Value of residence	-0.16	-0.3	0.23	0.9	-0.12	-0.4	-0.11	-1.8	-0.15	-0.3
Borrowings	<b>0.87</b>	<b>3.1</b>	0.26	2.0	-0.14	-0.9	-0.04	-1.3	<b>0.94</b>	<b>3.1</b>
Caste dummies (reference category = other backward classes)										
Scheduled tribes	-59.04	-1.1	-25.53	-1.0	<b>-57.55</b>	<b>-1.9</b>	<b>13.99</b>	<b>2.3</b>	<b>-128.13</b>	<b>-2.2</b>
Scheduled castes	-34.57	-0.6	<b>-72.23</b>	<b>-2.9</b>	<b>-55.92</b>	<b>-1.9</b>	<b>13.06</b>	<b>2.2</b>	<b>-149.65</b>	<b>-2.6</b>
Forward castes	<b>-104.98</b>	<b>-1.9</b>	14.78	0.6	<b>48.86</b>	<b>1.6</b>	-2.29	-0.4	-43.64	-0.8
Religion dummies (reference category = Muslim)										
Hindu	-251.50	-1.6	35.03	0.5	<b>305.53</b>	<b>3.5</b>	-10.24	-0.6	78.82	0.5
Christian	-80.90	-0.7	<b>-92.48</b>	<b>-1.8</b>	42.17	0.7	7.50	0.6	-123.71	-1.0
Marital status	9.93	1.4	-4.23	-1.3	-1.88	-0.5	-0.21	-0.3	3.60	0.5
Sex (men = 1; women = 0)	<b>132.74</b>	<b>2.6</b>	<b>96.65</b>	<b>4.1</b>	<b>154.09</b>	<b>5.4</b>	-3.08	-0.5	<b>380.39</b>	<b>6.9</b>
Years of schooling	-8.96	-1.8	0.83	0.4	<b>-9.00</b>	<b>-3.3</b>	-0.43	-0.8	<b>-17.57</b>	<b>-3.4</b>
Work experience	<b>13.03</b>	<b>2.0</b>	<b>8.80</b>	<b>3.0</b>	3.48	1.0	-0.33	-0.5	<b>24.97</b>	<b>3.6</b>
Age squared	-0.33	-2.3	-0.23	-3.4	-0.06	-0.8	0.00	0.2	<b>-0.62</b>	<b>-4.0</b>

Table 6. (continued)

Explanatory variable	Paid work		Self-employed in agriculture		Rearing livestock		Self-employed in non-agricultural work		Total of all economic activities	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
Height (cm)	<b>4.28</b>	<b>2.0</b>	-0.28	-0.3	<b>2.35</b>	<b>1.9</b>	0.02	0.1	<b>6.36</b>	<b>2.7</b>
Weight (kg)	-1.13	-0.5	-1.93	-1.8	<b>-4.50</b>	<b>-3.4</b>	<b>0.71</b>	<b>2.7</b>	<b>-6.85</b>	<b>-2.7</b>
Arm circumference (cm)	<b>18.54</b>	<b>2.8</b>	0.82	0.3	<b>12.50</b>	<b>3.4</b>	<b>-3.78</b>	<b>-5.1</b>	<b>28.08</b>	<b>4.0</b>
Constant	107.83	0.3	<b>648.65</b>	<b>3.8</b>	-194.28	-0.9	65.60	1.6	627.80	1.6
Pseudo R <sup>2</sup>		0.33		0.37		0.24		0.29		0.27

Note: If the "t" value is more than 2.58, the coefficient is significant at 1 per cent; if it is between 1.96 and 2.58, it is significant at 5 per cent; if it is between 1.65 and 1.96, it is significant at 10 per cent. The significant regression coefficients are expressed in bold.

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 on all economic activities.

### **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  $R^2$ . 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 7). 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.

### **Occupational segmentation**

In table 8, the respondents' main occupations are presented, based on the maximum number of days spent in the occupation for one year (2010). Of the 948 men between 15 and 65 years of age in the sample, 40 per cent were self-employed in agricultural, 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 washerman 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

**Table 7. Determinants of the log of wage rates (modified Mincer equation), women and men**

Variable	Women			Men		
	Coefficient	t	Mean	Coefficient	t	Mean
Farm size	-0.010	-1.7	1.979	<b>0.015</b>	<b>3.5</b>	3.071
Irrigated area	0.024	1.4	0.605	<b>0.023</b>	<b>1.8</b>	1.109
Value of assets	<b>0.001</b>	<b>2.7</b>	21.941	<b>0.002</b>	<b>4.6</b>	26.320
Value of residence	0.000	0.0	23.788	<b>0.002</b>	<b>3.9</b>	24.126
Borrowings	0.000	0.0	38.151	<b>0.001</b>	<b>4.8</b>	45.017
Caste (reference category = other backward classes)						
Scheduled tribes	<b>-0.092</b>	<b>-1.7</b>	0.109	0.089	1.6	0.135
Scheduled castes	-0.018	-0.4	0.189	-0.043	-0.7	0.159
Forward castes	0.053	1.0	0.132	<b>0.204</b>	<b>3.8</b>	0.178
Religion (reference category = Muslim)						
Hindu	0.065	0.5	0.956	0.173	1.6	0.937
Christian	-0.085	-0.5	0.024	<b>0.428</b>	<b>2.9</b>	0.034
Years of schooling	<b>-0.016</b>	<b>-3.2</b>	3.611	0.001	0.2	7.041
Work experience	-0.005	-0.9	17.515	<b>0.024</b>	<b>4.3</b>	15.624
Age squared	0.000	0.5	449.729	<b>-0.001</b>	<b>-4.3</b>	395.891
Height (cm)	<b>-0.008</b>	<b>-2.6</b>	150.891	0.002	1.2	163.306
Weight (kg)	<b>0.018</b>	<b>6.4</b>	46.144	<b>0.007</b>	<b>3.1</b>	55.160
Arm circumference (cm)	<b>-0.020</b>	<b>-3.1</b>	23.256	<b>0.016</b>	<b>2.2</b>	24.497
Main occupation (reference category = self-employed in agriculture)						
Non-farm labour	0.029	0.3	0.052	<b>0.135</b>	<b>2.2</b>	0.148
Rearing livestock	0.120	1.2	0.030	-0.044	-0.3	0.021
Regular employment	0.013	0.1	0.039	<b>0.237</b>	<b>3.3</b>	0.116
Attending educational institution	-0.135	-1.4	0.046	-0.145	-1.5	0.058
Domestic duties	-0.089	-1.2	0.072	0.097	0.3	0.004
Small business	-0.115	-1.5	0.060	<b>0.351</b>	<b>6.1</b>	0.166
Farm labour	0.046	1.1	0.425	0.037	0.7	0.154
Constant	5.309	11.3		3.280	9.1	
Adjusted R <sup>2</sup>		0.14			0.29	

Note: If the "t" value is more than 2.58, the coefficient is significant at 1 per cent; if it is between 1.96 and 2.58, it is significant at 5 per cent; if it is between 1.65 and 1.96, it is significant at 10 per cent. The significant regression coefficients are expressed in bold.

Table 8. Distribution of individuals by main occupation (percentage)

	Self-employed in agriculture	Non-farm labour	Rearing livestock	Caste occupations	Regular employment	Attending educational institutions	Attending domestic duties	Small business	Farm labour	Total
Sex										
Men	40	12	3	3	8	14	1	8	10	100
Women	29	3	11	1	2	10	21	2	21	100
Education										
Illiterate	42	8	10	3	1	0	9	2	25	100
Primary (1-5 years of schooling)	44	6	6	2	1	0	14	6	21	100
Middle (6-8 years of schooling)	39	9	9	2	4	2	14	5	16	100
Higher (9-10 years of schooling)	30	9	6	2	5	19	11	9	10	100
Intermediate (11-12 years of schooling)	26	7	1	2	10	32	10	8	5	100
Graduate or above (more than 12 years of schooling)	15	1	1	1	22	43	7	7	2	100
Landholdings										
Medium	45	7	6	1	5	12	10	4	10	100
Large	51	2	8	1	6	14	11	3	3	100
Landless	8	13	6	6	7	10	10	8	31	100
Age group (years)										
Below 15	3	4	0	0	0	82	6	0	5	100
15 to 24	17	10	4	2	5	36	10	4	11	100
25 to 60	42	7	8	2	6	1	10	6	18	100
Above 60	45	6	7	3	1	0	26	5	7	100
Caste group										
Other backward classes	37	8	6	3	4	12	8	5	16	100
Scheduled tribes	38	6	10	0	7	11	10	4	14	100
Scheduled castes	18	15	4	2	8	11	9	5	28	100
Forward castes	35	3	7	0	7	14	20	7	6	100
Total	35	8	7	2	5	12	11	5	15	100

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.

The results of the multinomial regression analysis for men are presented in table 9. The pseudo  $R^2$  is 0.27, indicating the explanatory variables included in the model explain the 27 per cent of variation in the occupational choice of men. The odds ratios,  $\exp(\beta)$ , were given along with z-values to test the significance of the regression coefficients. Among men, the probability of being engaged in self-employment in agriculture increased with an increase in the amount of irrigated area and years of education. The probability of being self-employed in agriculture was higher for scheduled tribes and for forward caste workers. The probability of being engaged in non-farm labour increased with an increased value of the residential house and with arm circumference. Neither social group, nor religious group nor education determined the choice of being engaged in non-farm labour or in farm labour.

The probability of being engaged in rearing livestock was higher among Hindus than among Muslims or Christians, and also increased with a greater irrigated area, value of assets or arm circumference (an increase in arm circumference equals greater physical capability). The probability of being engaged in regular employment increased with a larger irrigated area, a higher value of the residence and more years of education, which are indicators for increased labour productivity in rural areas. Regular employment was also significantly higher among respondents from scheduled tribes and forward castes. Along the same line, the probability of being engaged in small business activities increased with having a larger irrigated area and more years of education. Respondents from scheduled castes were less likely to be engaged in small business activities.

Individuals with a large farm or a residential house of greater value, or who were married, older or less educated had a higher probability of being engaged in domestic duties. However, workers with more assets (other than a house) and greater physical capability (with regard to height, weight and arm circumference) or who were more educated were less likely to be engaged in domestic duties. The probability of attending educational institutions was positively influenced by a larger irrigated area and the value of the residence, which are, in general, indicators of wealth. Regarding physical assets, owning irrigated land had a positive influence on choosing to be self-employed in agriculture, or on having a traditional occupation or regular employment. Social status also had a significant influence on the choice of



occupation; for example, members of scheduled castes were more likely to be engaged as farm labourers, while members of forward castes were more likely to be engaged in regular employment (receiving a monthly salary). Attending higher educational institutions and participating in domestic duties were less frequent activities among men compared with women in rural areas.

Among men, a 1 acre increase in irrigated area from the mean farm size increased the probability of being self-employed in agriculture by 60 per cent, while an increase in education by 1 year increased the probability of being self-employed in agriculture by 10 per cent compared with being engaged in farm labour, after controlling for other factors (see table 9). Compared with other backward class workers, scheduled tribe workers and forward caste workers were 2.8 times and 2.3 times more likely to be self-employed in agriculture, respectively. A 1 year increase in work experience in agricultural activities reduced the probability of being engaged as a non-farm labourer by 20 per cent. A 1 cm increase in arm circumference increased the workers' probability of being engaged in non-farm labour by 30 per cent and increased the probability of being engaged in rearing livestock by 50 per cent. A 1 acre increase in irrigated area increased the workers' probability of being engaged in regular employment by 50 per cent after controlling for other factors. An additional year of schooling increased the workers' probability of being engaged in regular employment by 30 per cent. A 1 acre increase in irrigated area increased the workers' probability of being engaged in a small business by 60 per cent. One year of additional schooling increased the workers' probability of being engaged in a small business by 20 per cent.

The explanatory variables included in the model explained approximately 30 per cent of the variation in the occupational choice of the female respondents as indicated by pseudo  $R^2$  (see table 10). Among women, the probability of being self-employed in agriculture increased with an increase in the size of the farm owned by the family. Owning large pieces of land creates employment opportunities for women. Generally, Indian women living in rural areas are underweight; hence, an increase in body weight means women are better able to participate in economic activities, especially self-employment in agriculture. The probability of being engaged in rearing livestock increased with an increase in the size of irrigated area. Hindu women were more likely to be engaged in rearing livestock than Muslim women (Muslim women were the reference group). The probability of being engaged in domestic duties increased with an increase in the level of education, after controlling for other variables. The probability of being engaged in regular employment increased with an increase in irrigated area, years of schooling, work experience, height and weight. Women's probability of being engaged in small business activities rose with an increase in the value of assets (other than the residential house) and an increase in

**Table 9. Determinants of men respondents' main occupation (farm labour as the reference category)**

Explanatory variable	Self-employed in agriculture		Non-farm labour		Rearing livestock		Regular employment		Attending educational institutions		Attending domestic duties		Small business		Farm labour	
	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z
Farm size	1.1	1.2	1.0	-0.1	0.9	-1.1	1.0	0.0	1.1	1.4	3.4	3.7	0.9	-1.3	1.0	1.0
Irrigated area	<b>1.6</b>	<b>2.6</b>	1.3	1.0	<b>8.0</b>	<b>2.0</b>	<b>1.5</b>	<b>2.2</b>	<b>1.8</b>	<b>1.8</b>	0.01	0.1	1.6	2.4	1.0	1.0
Value of assets	1.0	0.1	1.0	-1.6	<b>1.0</b>	<b>1.9</b>	1.0	-0.9	1.0	-2.5	<b>0.9</b>	<b>-3.4</b>	1.0	-0.1	1.0	1.0
Value of residence	1.0	1.2	<b>1.0</b>	<b>2.5</b>	1.0	-0.4	<b>1.0</b>	<b>2.2</b>	1.1	4.0	<b>1.3</b>	<b>6.3</b>	1.0	1.0	1.0	1.0
<b>Caste dummies (reference category = other backward classes)</b>																
Scheduled tribes	2.8	2.9	1.8	1.2	2.1	0.9	<b>6.1</b>	<b>3.5</b>	4.2	2.0	0.0	0.1	1.5	0.9	1.0	1.0
Scheduled castes	0.5	-2.1	1.3	0.6	0.7	-0.5	2.1	1.5	0.6	-0.6	0.0	-0.1	0.2	-2.7	1.0	1.0
Forward castes	<b>2.3</b>	<b>2.1</b>	1.4	0.7	0.7	-0.3	<b>5.2</b>	<b>3.2</b>	0.6	-0.6	<b>8.0</b>	<b>11.9</b>	1.4	0.8	1.0	1.0
<b>Religion dummies (reference category = Muslim)</b>																
Christian	0.8	-0.3	1.3	0.2	<b>8.0</b>	<b>2.4</b>	0.9	-0.1	0.5	-0.4	0.0	.	2.6	0.9	1.0	1.0
Hindu	1.9	1.0	1.8	0.9	<b>8.0</b>	<b>2.6</b>	3.2	1.0	0.9	-0.1	8.0	1.5	1.2	0.3	1.0	1.0
Marital status	0.8	-3.7	0.9	-1.7	1.0	-0.1	1.0	-0.2	<b>3.9</b>	<b>7.0</b>	<b>25.2</b>	<b>17.7</b>	<b>0.9</b>	<b>-2.2</b>	1.0	1.0
Years of schooling	<b>1.1</b>	<b>2.0</b>	1.0	-0.4	0.9	-1.7	<b>1.3</b>	<b>5.8</b>	<b>2.2</b>	<b>5.2</b>	<b>0.1</b>	<b>-12.6</b>	<b>1.2</b>	<b>6.0</b>	1.0	1.0
Work experience	1.0	-0.5	<b>0.8</b>	<b>-3.6</b>	0.8	-1.2	1.0	-0.7	0.2	-1.4	<b>19.8</b>	<b>16.7</b>	0.9	-1.1	1.0	1.0
Age squared	1.0	0.9	<b>1.0</b>	<b>3.2</b>	1.0	1.4	1.0	1.2	1.0	-0.1	<b>0.9</b>	<b>-15.9</b>	1.0	1.4	1.0	1.0
Height (cm)	1.0	-0.7	1.0	-1.8	1.0	-0.3	1.0	0.0	1.0	-0.7	<b>0.6</b>	<b>-6.3</b>	1.0	-0.3	1.0	1.0
Weight (kg)	1.0	0.5	1.0	-0.8	0.9	-1.7	1.1	2.3	0.9	-2.3	<b>0.5</b>	<b>-5.2</b>	1.0	1.9	1.0	1.0
Arm circumference (cm)	1.1	1.0	<b>1.3</b>	<b>4.8</b>	<b>1.5</b>	<b>3.7</b>	1.1	0.8	1.1	0.4	<b>0.1</b>	<b>-8.0</b>	1.0	0.7	1.0	1.0
Pseudo R <sup>2</sup>	0.27															

Note: If the "z" value is more than 2.58, the regression coefficient is significant at 1 per cent; if it is between 1.96 and 2.58, it is significant at 5 per cent; if it is between 1.65 and 1.96, it is significant at 10 per cent. Bold figures indicate that the regression coefficients are statistically significant.

years of education. Regular employment, attending higher educational institutions and non-farm labour were less common occupations of the female respondents.

Among the female respondents, with 1 additional acre of land, the probability of being self-employed in agriculture increased by 10 per cent, and the probability of being engaged in non-agricultural labour decreased by 20 per cent. The probability of scheduled caste women being engaged in non-farm labour was 240 per cent higher than it was for other backward class women. The probability of being engaged in rearing livestock increased by 290 per cent with a 1 acre increase in the area being irrigated, or increased by 10 per cent with a 1 kg increase in body weight. The probability of being engaged in regular employment increased by 330 per cent with a 1 acre increase in irrigated area, by 50 per cent with an additional year of schooling, by 30 per cent with an additional year of work experience, or by 10 per cent with a 1 kg increase in body weight and a 1 cm increase in height. With an additional year of schooling, the probability of being engaged in a small business increased by 20 per cent, of being engaged in regular employment by 50 per cent and of being engaged in domestic duties by 40 per cent.

### **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

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

Explanatory variable	Self-employed in agriculture		Non-farm labour		Rearing livestock		Regular employment		Attending educational institutions		Attending domestic duties		Small business		Farm labour	
	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z	Exp(β)	Z
Farm size	1.1	2.3	0.8	-1.8	0.8	-1.2	0.8	-1.2	1.3	1.4	1.1	1.3	1.1	0.9	1.0	1.0
Irrigated area	1.2	0.8	1.9	1.6	3.9	2.3	4.3	2.6	0.6	-1.2	1.0	0.1	0.8	-0.7	1.0	1.0
Value of assets	1.0	1.1	1.0	-0.8	1.0	-0.3	1.0	-1.5	1.1	1.9	1.0	0.7	1.0	2.5	1.0	1.0
Value of residence	1.0	-0.9	1.0	0.5	1.0	0.3	1.0	1.6	1.0	-0.4	1.0	-0.8	1.0	-2.0	1.0	1.0
Borrowings	1.0	4.4	1.0	-0.1	1.0	-2.2	1.0	0.8	1.0	0.2	1.0	0.0	1.0	-0.3	1.0	1.0
<b>Caste group</b>																
Scheduled tribes	0.5	-1.8	0.3	-1.1	1.7	0.8	1.0	0.0	0.5	-0.7	0.4	-1.2	0.0	0.0	0.0	1.0
Scheduled castes	0.6	-1.7	3.4	2.5	0.3	-0.9	4.4	1.6	1.9	0.7	0.8	-0.4	0.6	-0.8	1.0	1.0
Forward castes	1.4	1.0	0.0	0.0	2.5	1.3	4.7	2.1	0.0	0.0	2.6	1.7	1.3	0.4	1.0	1.0
<b>Religious group (reference category = Muslim women)</b>																
Christian	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	-0.7	0.0	0.0	0.0	1.0
Hindu	3.8	1.2	0.4	-1.2	8.0	3.0	8.0	3.3	8.0	6.3	0.3	-1.0	0.1	-2.6	1.0	1.0
Marital status	1.0	-0.9	1.1	1.6	0.8	-1.5	1.3	3.6	5.3	6.7	0.9	-1.9	0.9	-1.6	1.0	1.0
Years of schooling	1.1	1.4	1.1	1.3	1.0	0.2	1.5	4.9	1.5	2.5	1.4	5.5	1.2	4.2	1.0	1.0
Work experience	1.1	1.4	1.2	1.7	0.9	-0.5	1.3	2.6	0.0	-5.8	0.9	-1.5	1.0	-0.5	1.0	1.0
Age-squared	1.0	-1.3	1.0	-1.9	1.0	0.5	1.0	-1.8	1.2	5.2	1.0	2.1	1.0	1.3	1.0	1.0
Height (cm)	1.0	1.5	1.0	0.1	1.1	2.3	1.1	1.9	0.9	-0.8	1.0	0.0	1.0	-0.8	1.0	1.0
Weight (kg)	1.0	1.8	1.0	-1.6	1.0	1.0	1.1	1.9	1.0	-0.3	1.0	1.2	1.1	2.3	1.0	1.0
Arm circumference (cm)	1.0	-0.4	1.2	2.3	0.9	-1.4	0.8	-1.9	0.8	-1.4	0.9	-1.7	1.0	-0.5	1.0	1.0
Adjusted R <sup>2</sup>	30.0															

Note: If the "z" value is more than 2.58, the regression coefficient is significant at 1 per cent; if it is between 1.96 and 2.58, it is significant at 5 per cent; if it is between 1.65 and 1.96, it is significant at 10 per cent. The significant coefficients are highlighted in bold.

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 the sociocultural 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.

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