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Measuring Female Work Participation in Rural India: What Do the Primary and Secondary Data Show?

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Abstract: A serious problem related to structural changes in the Indian economy has been the low and declining worker-population ratio (WPR) of women in rural India over the last two to three decades. Fluctuations in the estimated number of workers across different categories of workers suggest the probability of classification errors in the National Sample Survey Organisation's (NSSO) Employment and Unemployment Surveys (EUS). From the point of view of the conceptual validity of economic activity and to prevent possible measurement errors, it is preferable to calculate augmented WPR by including the specified activities category (i), i.e., production of primary goods for home consumption, including animal husbandry. The trend in female WPR after 2011–12 is unknown as the NSSO stopped disseminating EUS data. After examining comparability with the Labour Bureau's EUS data, we use the latter to extend female WPR up to 2015–16. This exercise shows that the decline of female WPR after 2004–05 decelerated but continued till 2015–16. Village surveys conducted by the Foundation for Agrarian Studies (FAS) in West Bengal in 2010 and 2015 show that female employment opportunities outside the village were limited, and that most employment was in agriculture. Further, female WPRs in West Bengal are low. Animal husbandry is an important aspect of the work of women in the village. A majority of female workers engaged in animal husbandry belong to poor, marginal, and landless households in the village. We argue that WPR defined as usual principal and subsidiary status (UPSS), plus specified activity participation rate, may be more appropriate for measuring women's participation in economic activities in rural areas, than WPR (UPSS) alone.

Keywords: NSSO, rural, India, work participation rate, primary occupation, secondary occupation, West Bengal, village survey, panel data.

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INTRODUCTION

There has been a decline in the female worker population ratio (WPR) and labour force participation rate (LFPR) in rural India over the last two to three decades.¹ This is an issue of serious concern in a period of rapid economic growth. One set of studies on this topic – “mainstream” studies – has focused on structural changes in the Indian economy, specifically the U-shaped relationship between economic development and women’s participation in the labour market. According to this approach, improvements in school attendance, income effects, and social restrictions are the major factors influencing female WPR. These studies, particularly econometric analyses, use the Employment and Unemployment Survey (EUS) of the National Sample Survey Organisation (NSSO), and combine usual principal status (UPS) and usual subsidiary status (USS) workers to calculate the WPR; further, they include unemployment to estimate the LFPR. Differences between UPS and USS workers, or between different employment status (own account worker, unpaid family helper, regular wage/salaried worker, and casual labourer), are not taken into account. In short, the movement of workers across these categories is ignored.

A second set of studies has raised doubts about the concept of female workers in the Employment and Unemployment Survey of the NSSO. The problem relates to the delineation of the production boundary, and emerges from the cut-off used to separate activities within and outside the production boundary especially as it affects a wide range of activities undertaken by women. The production boundary as defined by the United Nations’ System of National Accounts (SNA) is much wider than that of the EUS of the NSSO. As compared to the former, the latter uses a rather narrow concept of economic activity, and excludes various kinds of activities from the ambit of economic production. However, the EUS collects information on women’s participation in various specific activities and publishes these results, but none of the 12 specified activities is taken into account in the calculation of WPR. This strand of the literature suggests that a time-use survey is the only way to capture the work participation of rural women.

In spite of the substantial literature on WPR, two major questions remain. The first is whether the low observed female labour force participation ratio of Indian women is real. It is not clear if the official EUS data manage to capture rural women’s participation in economic activities where there is no participation in the labour market. Secondly, there is a question of whether there been a real and rapid decline in female WPR or LFPR since 2004–05. The WPR is a head count ratio, assigning the weight as either worker = 1 or non-worker = 0 for each person. A change in the

¹ Ever since P. Visaria and others criticised the reliability of economic tables of the Population Census, most studies on employment and/or the labour market have used the NSSO’s Employment and Unemployment Survey. Unfortunately, there are few studies that analyse employment during the post-reform period using Population Census data. The review of research literature by Mehrotra (2017) is quite extensive.

duration of work, such as between principal and subsidiary activities, is not taken into consideration.

In order to address these questions, the next section of this paper examines the concept of “worker,” and modifies the female WPR by taking account of information on specific activities. It also examines issues of measurement in the NSSO’s EUS.

To examine trends in WPR beyond 2011–12, we use unit-level data of the EUS conducted by the Labour Bureau (LB) in 2015–16 after checking for comparability with the NSSO (in the third section of the paper).

Lastly, we examine village-level data on workers from the survey of three villages of West Bengal conducted by the Foundation for Agrarian Studies (FAS). The FAS surveys provide us panel data with a five-year interval, which permits us to look at changes in the employment situation at the village level. West Bengal is a State with a very low female WPR according to the NSSO’s EUS, but the work participation rate is substantially higher if economic activities in the secondary and tertiary status are considered. This exercise provides us with valuable insights on measuring different aspects of women’s participation in economic activities.

REDEFINING FEMALE WORK PARTICIPATION

Following Kapsos *et al.* (2014), some researchers have talked of an augmented labour force participation rate (LFPR). Nevertheless, most studies use the worker/non-worker dichotomy given by the NSSO, without differentiating between usual principal status (UPS) workers and usual subsidiary status (USS) workers.

The System of National Accounts (SNA) of the United Nations (UN) includes the following types of production by households within the production boundary, whether intended for own final consumption or not.

- a. The production of agricultural products and their subsequent storage; the gathering of berries or other uncultivated crops; forestry; wood-cutting and the collection of firewood; and hunting and fishing.
- b. The process of production of other primary products, such as mining salt, cutting peat, supply of water, etc.
- c. The processing of agricultural products; the production of grain by threshing; the production of flour by milling; the curing of skins and the production of leather; the production and preservation of meat and fish products; the preservation of fruit by drying, bottling, etc.; the production of dairy products such as butter or cheese; the production of beer, wine, or spirits; the production of baskets or mats.

- d. Other kinds of production processes such as weaving cloth; dress-making and tailoring; production of footwear; production of pottery, utensils, or durables; making furniture or furnishings (UN SNA 1993; 2008).

On the other hand, the term “economic activity” as defined in the EUS of the NSSO includes:

- i) all market activities performed for pay or profit that result in production of goods and services for exchange;
- ii) non-market activities;
 - a. all activities related to the agriculture, forestry, fishing, mining, and quarrying sectors (i.e. industry divisions 01 to 09 of NIC-2008) that result in the production of primary goods for own consumption (including free collection of uncultivated crops and firewood, forestry, hunting, fishing, mining, quarrying, etc.); and
 - b. activities related to own-account production of fixed assets, which includes production of fixed assets such as construction of own house, roads, wells, etc., and of machinery, tools for household enterprise, and construction of any private or community facilities, free of charge. A person may be engaged in own account construction in the capacity of either a labourer or a supervisor (NSSO 2014a).

In addition, information on women engaged in specified activities, as listed below, is separately collected by the EUS of the NSSO.

Category (i): Activities relating to agricultural production, such as maintenance of kitchen garden, work in household poultry, dairy, etc., including free collection of agricultural products for household consumption.

Category (ii): Processing of primary products for household consumption.

Category (iii): Other activities for own consumption but resulting in economic benefits to the household (NSSO 2014b).

Activities listed under category (i) fall within the production boundary defined by the United Nations’ System of National Accounts, 2008 (SNA-2008) as well as the Indian System of National Accounts (ISNA). However, if women performed these activities *nominally*, they were not considered to be usual principal status or usual subsidiary status workers. Activities under category (ii) are viewed as economic activities according to the recommendations of SNA-2008, but the ISNA has not, so far, considered them as economic activities if they are carried out for own consumption. Some activities under category (iii), such as preparing cowdung cakes and fetching water from beyond the premises of the household, when pursued for own

consumption, are within the production boundary of SNA-2008. Other activities under category (iii) are not considered economic activities either by SNA-2008 or by the ISNA (NSSO 2014b).

It is clear that the activities listed under category (i) are conceptually within the production boundary and, more specifically, agriculture, in a broad sense. This raises the question as to how women are classified as workers or non-workers. Let us illustrate with the case of livestock rearing, a specified activity (SA02). Depending on the number of work days, a woman who is more or less regularly engaged in animal husbandry (SA02) will be categorised as a worker in agriculture, either self-employed (11) or family helper (21), or as a “non-worker but a specified activity participant.” She could be placed in any of the following three categories:

1. Usual principal status (UPS) worker in animal husbandry;
2. Usual subsidiary status (USS) worker in animal husbandry;
3. Non-worker with participation in animal husbandry as a specified activity (SA).

In practice, however, it is very difficult to differentiate the status of a woman worker as between categories (2) and (3). Besides, the EUS is not a time-use survey, and, as a result, recall errors and arbitrariness may arise in classifying a woman as a worker, a non-worker, or a SA participant.

Table 1 shows the estimated number of USS workers in self-employed status (i.e. NSS category of 11, 12, and 21, including employer and family helper), and SA02 participants among them. It also shows the number of non-workers who participated in SA. It is seen that a majority of USS workers (self-employed) in agriculture are also engaged in the specified activity of animal husbandry. Thus, in 2004–05, out of 21.5 million USS women workers who were self-employed in agriculture, 14.9 million (about 70 per cent) were also engaged in animal husbandry as a specified activity. Except in 2011–12, the proportion of USS workers engaged in animal husbandry varied between 64 and 70 per cent. It is not clear how these women were categorised as USS workers since they worked more than 30 days in animal husbandry, or as workers in crop cultivation but also engaged in household poultry or dairy.

Table 2 shows the number of UPS and USS workers who were engaged in crop cultivation and animal husbandry. USS workers are categorised as workers if they worked for more than 30 days in agriculture. For example, in 1993–94, a total of 34.3 million workers were categorised as USS self-employed in agriculture, of whom 10.8 million were USS workers engaged in animal husbandry for a period exceeding 30 days.

Now, let us compare the number of USS workers with animal husbandry as specified activity (SA) in Table 1 with USS workers (self-employed) in animal husbandry in

Table 1 *Estimates of usual subsidiary status (USS) self-employed workers in agriculture who are also engaged in a specified activity (animal husbandry), and non-workers who are participants in a specified activity (animal husbandry), 1993–94 to 2011–12 in number and per cent*

Year	USS workers			Non-workers	
	Self-employed in agriculture	Participants in animal husbandry as SA		Number of participants in animal husbandry as SA without USS work	
	Total (in million)	Total (in million)	Share	Total (in million)	Proportion of women engaged in domestic duties
(1)	(2)	(3)	(4 = 3/2)	(5)	(6)
1993–94	17.9	11.6	64.9	24.9	30.1
1999–2000	15.9	10.3	64.6	24.8	26.6
2004–05	21.5	14.9	69.6	23.3	25.3
2009–10	13	8.3	63.7	26.1	21.3
2011–12	16.1	8.1	50.4	24.2	18.4

Note: Estimated using unit data of the NSSO’s EUS, various rounds, for rural areas only, and for females aged 15 years and above. Figures have not been adjusted to the Census population.

Table 2. In 1993–94, for example, out of 11.6 million USS workers with SA animal husbandry, 10.8 million were “USS animal husbandry workers.” The difference of 0.9 million women could be those engaged in animal husbandry (AH) as a specified activity (SA), in short, “USS workers with SA (AH).”

We next look at the change in the number of workers for these three categories over the last 20 years: (1) USS animal husbandry workers (Table 2, column 7); (2) USS workers with SA (AH) (Table 1, column 3); and (3) non-workers with SA (AH) (Table 1, column 5).

The fluctuation in numbers of these three categories of workers was substantial between 1993–94 and 2009–10. About 3–4 million animal husbandry workers became USS workers with SA (AH) between 1993–94 and 1999–2000. Between 1999–2000 and 2004–05, there was a substantial increase in the number of workers engaged in animal husbandry. The number of USS animal husbandry workers increased by 3.6 million, and that of USS workers with SA (AH) by one million. In the same period, the number of UPS workers in animal husbandry also increased by 2.6 million. In contrast, the number of animal husbandry workers fell between 2004–05 and 2009–10. USS animal husbandry workers decreased in number by 4.6 million and USS workers with SA (AH) fell by 2 million. This abnormal fluctuation in the number of workers in animal husbandry and SA02 participants, we argue, caused the rise and fall in female WPR in this period. It is not clear if this change was real, or due to errors in the classification of workers and non-workers.

Table 2 *Female workers engaged in agriculture, usual principal status and usual subsidiary status, 1993–94 to 2011–12 in numbers*

Period	Usual principal status (UPS) workers			Usual subsidiary status (USS) workers		
	Self-employed workers (codes: 11, 12, 21)					
	Total employed in agriculture (in million)	Total employed in crop cultivation (in million)	Total employed in animal husbandry (in million)	Total employed in agriculture (in million)	Total employed in crop cultivation (in million)	Total employed in animal husbandry (in million)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1993—94	28.3	24.5	3.2	34.3	22.5	10.8
1999—2000	30.3	27.6	2.5	16.2	9.5	6.4
2004—05	39.5	33.9	5.2	22.9	12.5	10.1
2009—10	29.9	26.4	3.3	14	8.2	5.5
2011—12	26.4	25.4	2.4	17	10.5	5.8

Note: See Table 1.

Table 3 *Estimates of various categories of female workers in animal husbandry in numbers*

Period	USS workers in animal husbandry (AH) (in million)	Participants with AH as SA (in million)	USS workers with SA (AH) (million)	Non-workers with SA (AH) (million)
1993—94	10.8	11.6	0.9	24.9
1999—2000	6.4	10.3	3.9	24.8
2004—05	10.1	14.9	4.9	23.3
2009—10	5.5	8.3	2.8	26.1
2011—12	5.8	8.1	2.3	24.2

Note: See Tables 1 and 2.

Table 4 *Comparison of the EUS survey method of the NSSO and the Labour Bureau*

	NSSO	Labour Bureau
Method	Stratified multistage sampling design	Stratified multistage sampling design
Sampling frame	2001 census villages/urban frame sampling blocks	2011 census villages/urban frame sampling blocks
Stratification	Rural and urban, and sub-stratum formed (Rural) Probability proportional to size with replacement (Urban) Simple random sampling without replacement Hamlet group/sub-block formation for big villages/urban blocks	Rural and urban stratum, no sub-stratum formed Circular systematic sampling technique with probability proportional to size Hamlet group/sub-block formation for big villages/urban blocks
No. of villages and urban blocks allocated (surveyed)	7,508 (7,469) villages and 5,276 (5,268) urban blocks	7,412 (7,405) villages and 5,660 (5,654) urban blocks
Ultimate stage unit (USU)	Households	Households
Sampling frame	All households listed	All households listed
Second stage strata (SSS) formation	SSS1: Relatively affluent households SSS2: The remaining households have principal earning from non-agricultural activity	Number of household members aged 15 years and above SSS1: 1 SSS2: 2—3

(continued on next page)

Table 4 (continued) *Comparison of the EUS survey method of the NSSO and the Labour Bureau*

	NSSO	Labour Bureau
	SSS3: Other households	SSS3: 4–5 SSS4: 6 and above
	8 households (SSS1, 2; SSS2, 4; SSS3, 2)/village	12 households/village (SSS1, 1; SSS2, 3; SSS3, 4; SSS4, 4)
No. of households surveyed	59,700 (rural) and 42,024 (urban) households	88,783 (rural) and 67,780 (urban) households
Classification of persons by usual activity status		
Usual principal worker	Major time criterion by number of months worked Number of months employed, unemployed, and not in labour force are first enquired, and based on this information the category code number is recorded	Major time criterion by number of months worked The number of months employed, unemployed, and not in labour force are first recorded, and then particulars of each month are recorded. Major time criterion by the number of days worked is applied to each month
Usual subsidiary status worker	A person will be considered to have worked in the subsidiary capacity if he/she has worked for a minimum period of 30 days, not necessarily continuously, during the last 365 days (A person who worked five days in each month for six months is categorised as a subsidiary worker)	(A person who worked five days in each month for six months may not be categorised as a subsidiary worker) As a result, there may be underenumeration for subsidiary status workers

Source: Prepared by the author.

This exercise points towards a probable scenario but does not offer enough evidence to resolve measurement issues.

EXTENDING THE TREND IN FEMALE WPR BEYOND 2011–12

We now turn to a survey conducted by the Labour Bureau, and compare it with the EUS of the NSSO (Table 4). The sampling method is similar in the two stages: namely, a multistage stratified sampling method, with villages/urban blocks as the first stage units and households as the ultimate stage unit. As for sample size, the number of sample villages/urban blocks was almost the same, while the number of households was larger in the Labour Bureau's survey (12 households) than in the NSSO's survey (eight households).

The major differences between the NSSO and the Labour Bureau are as follows:

1. Formation of second stage strata. In the NSSO, there are three second stage strata (SSS): SSS1 comprises relatively affluent households; SSS2 comprises households that have principal earnings from non-agricultural activity; and SSS3 comprises other households. On the other hand, the Employment and Unemployment Survey of the Labour Bureau has four second stage strata formed on the basis of number of household members above the age of 15. These four strata are: SSS1, with 1 person; SSS2, with 2–3 persons; SSS3, with 4–5 persons; and SSS4, with 6 persons and above. The two surveys have very different second stage strata.
2. Definition of usual subsidiary status workers. The NSSO makes it clear that a subsidiary worker is one who has worked for a minimum of 30 days during the 365 days prior to the survey, though not necessarily for a continuous period. In the Labour Bureau's questionnaire schedule, there is a question on the number of months a person is available for work and his/her employment status in the last 12 months. Further, there is a question on the particulars for each month (whether employed, unemployed, or not in the labour force). Thus, a person who has worked five days every month for a period of six months is categorised as a usual subsidiary status worker according to the NSSO, but he/she may not be so categorised in the Labour Bureau's EUS. This may result in underenumeration of USS workers in the Labour Bureau's EUS, as we show later.

We provide some estimates based on the two employment surveys in Table 5.

We observe a difference in the estimated size of households as between the NSSO and the Labour Bureau, but the Labour Bureau's estimate is closer to the 2011 Census figures.² The proportions of Scheduled Caste (SC) and Scheduled Tribe (ST) workers

² Interestingly, the Labour Bureau's EUS has captured the size of the transgender population in India.

Table 5 *Comparison of some EUS estimates between the NSSO and the Labour Bureau*

(A) Size of household						
	NSSO	Labour Bureau	Census 2011			
Rural	4.6	5.0	4.9			
Urban	4.1	4.4	4.6			
(B) Distribution of population by sex (15 years and above)						
	NSSO (percentage)		Labour Bureau (percentage)			
	Male	Female	Male	Female	Transgender	
Rural	50.4	49.6	52.	47.9	0.1	
Urban	51.5	48.5	51.53	48.4	0.1	
(C) Distribution of population by social group						
	Rural (percentage)			Urban (percentage)		
	NSSO	Labour Bureau	Census	NSSO	Labour Bureau	Census
ST (Scheduled Tribe)	10.8	11.5	11.3	3.4	4.6	2.8
SC (Scheduled Caste)	20.7	22.4	18.5	14.3	13.9	12.6
OBC (Other Backward Classes)	45.1	40.9		41.4	40.1	
Others	23.4	25.2	70.3	40.8	41.4	84.6
All	100	100	100	100	100	100

Sources: NSSO 2011; Labour Bureau 2011; Census 2011.

in the Labour Bureau's EUS are higher than in the NSSO estimates and the Census. A more detailed analysis is required to judge the difference between the two surveys, but our preliminary analysis suggests that the Labour Bureau's EUS is comparable in a broad sense with the NSSO's EUS at the all-India level. Care would be required when estimates of USS workers are compared, however, as the Labour Bureau's estimates are liable to be under-estimates.

Table 6 shows the trend in female WPRs in rural India separately for UPS and USS workers, and by status (two digits) and industry (one digit). Industry is classified into four groups, with the following codes: agriculture – 1; manufacturing – 2; construction – 3; service sector – 4. Thus, code 111 stands for self-employed (11) in agriculture (1). Similarly, 312 stands for regular wage worker (31) in manufacturing industry (2), and 513 stands for casual labourer (51) in construction (3).

We examine the WPRs of usual principal and subsidiary status (UPSS) workers, but also separately for UPS and USS workers. The decline in WPR between 2004–05 and 2011–12 was different for principal and secondary status workers. The WPR of UPS declined by 10.9 percentage points, from 35.9 per cent to 25 per cent, in this period,

Table 6 *Worker population ratio for women, by activity status and industry, 2004–05 to 2015–16 in per cent*

	Rural											
	Usual Principal and Subsidiary Status (UPSS)				Usual Principal Status (UPS)				Usual Subsidiary Status (USS)			
	2004–05	2009–10	2011–12	2015–16	2004–05	2009–10	2011–12	2015–16	2004–05	2009–10	2011–12	2015–16
111	26.1	17.3	17	11.1	16.6	11.9	10.7	8.2	9.5	5.4	6.3	2.9
112	3.1	2	2.6	1.3	2.3	1.6	1.6	1	0.8	0.4	1	0.2
113	0	0	0	0	0	0	0	0	0	0	0	0
114	1.7	1.3	1.2	1.2	1.4	1.1	1	1	0.3	0.2	0.2	0.2
311	0.2	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0	0	0	0
312	0.3	0.2	0.3	0.5	0.3	0.2	0.3	0.4	0	0	0	0
313	0	0	0	0.1	0	0	0	0	0	0	0	0
314	1.3	1.3	1.5	2.3	1.2	1.3	1.4	2.3	0.1	0	0.1	0
511	14.2	12.1	9.3	10.4	12.5	10.9	7.8	9.2	1.7	1.2	1.5	1.2
512	0.7	0.6	0.6	0.7	0.6	0.5	0.5	0.7	0.1	0.1	0.1	0.1
513	0.7	1.9	2.3	2.1	0.6	1.2	1.3	1.2	0.1	0.7	1.1	0.9
514	0.2	0.3	0.2	0.4	0.2	0.2	0.2	0.3	0	0	0	0.1
All	48.5	37.2	35.2	30.2	35.9	29	25	24.6	12.6	8.2	10.3	5.6
SA1-4	20.1	26.5	26.7									
SA1-12	29.2	34.8	33.6									

Note: The codes are: 111 – self-employed in agriculture; 112 – self-employed in manufacturing; 113 – self-employed in construction; 114 – self-employed in service sector; 311 – regular wage workers in agriculture; 312 – regular wage workers in manufacturing; 313 – regular wage workers in construction; 314 – regular wage workers in service sector; 511 – casual labour in agriculture; 512 – casual labour in manufacturing; 513 – casual labour in construction; and 514 – casual labour in service sectors.

Source: Employment and Unemployment Survey, NSS, various years.

while the WPR of USS workers declined from 12.6 per cent to 10.3 per cent, just 2.3 percentage points, in the same period.

Secondly, when we look at the change in WPR by employment status and industry, it is evident that WPR declined the most for those who were self-employed in agriculture (including 111, 121, and 211) and casual labourers in agriculture (511).

For WPR of usual subsidiary status workers, casual labour in agriculture remained at a similar level, but casual labour in construction rose by 1 percentage point. The WPR of casual labour in construction rose for both the UPS and USS groups.

When the WPR of specified activity (1–4) is added, there is a finding of interest. The WPR for those who were self-employed in agriculture declined by 9.1 percentage points, but that for SA (1–4) rose by 6.6 percentage points. Again, it is not clear if this change did in fact occur, or if it is due to measurement errors.

In short, extending the trend analysis from 2011–12 to 2015–16 using the Labour Bureau surveys to understand women's WPR remains problematic. Using usual principal status (UPS) workers, the decline in WPR is small. It is more evident using usual subsidiary status (USS) workers. However, a comparison between 2011–12 and 2015–16 is complicated by the inclusion of a separate category, called specified activity (SA), in the NSSO, which is absent in the Labour Bureau.

EVIDENCE FROM VILLAGE SURVEYS

The Foundation for Agrarian Studies (FAS), as part of its Project on Agrarian Relations in India (PARI), carried out a census survey of three villages of West Bengal in 2010, and a sample of households in the same villages was resurveyed in 2015. The number of households and persons surveyed are given in Table 7. We have panel data on 214 households with an interval of five years, 2010 and 2015. In this paper, we identify workers using usual status occupation/activity data of 371 women of age 15 years and above among the sample households.³

In the survey schedule, information was collected from each person on multiple activities or occupation status, i.e. primary, secondary, tertiary, and other employment. The ordering of activity status is according to the respondent's perception rather than major time or major income criterion. Nevertheless, the responses are reliable because of the fact that most women regarded work under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) (because of limited number of work days) and animal husbandry (because of limited time spent in animal husbandry) as their secondary or tertiary activity status. From these data, women who reported themselves as being engaged in economic

³ There were 317 women in 2010, and 54 women who were added to the panel through marriage.

Table 7 *List of FAS study villages with number of households surveyed, male and female composition, and persons aged 15 years and above, West Bengal, 2010 and 2015*

(A) Number of households surveyed				
Village	2010		2015	
Amarsinghi	127		55	
Kalmandasguri	147		52	
Panahar	248		107	
All	522		214	
(B) Persons surveyed				
	2010		2015	
	Male	Female	Male	Female
All	1,710	1,631	515	468
(C) Sample persons aged 15 years and above				
	2010		2015	
	Male	Female	Male	Female
Total	361	317	372	371
(not surveyed in 2010)	11	54		

Source: FAS village survey data.

activity are categorised as workers irrespective of the number of work days. The estimates of workers here are thus an upper limit of female WPR in these villages of West Bengal.

Employment opportunities for women were more or less limited to agriculture-related activities in these three villages. Appendix Table 1 shows male and female activities in 2015. Panel (A) indicates the primary and secondary status activities of males in 2015. (We assume that primary and secondary status activities are sufficient to approximate the employment situation in the villages.) On combining the primary and secondary status (PS and SS) activities, we find that about one-half (180) of all men were engaged in non-agricultural employment, most of which was provided outside the village.

Panel (B) in Appendix Table 1 shows the primary and secondary status activities of women. Employment opportunities for women were limited in non-agricultural sectors. Only 18 women reported non-farm employment as either primary or secondary status activity. Employment opportunities for women in the village in manufacturing, trade, transport, and government and other service sectors were negligible. The most important activity for women was housework. Thus, 239 women and 51 women reported housework as primary and secondary status activity, respectively. Self-employment in agriculture was next in importance.

Adding primary status and secondary status activities, 74 women (19.9 per cent) were self-employed in agriculture. Similarly, 58 women (15.6 per cent) reported agricultural labour as primary or secondary activity. Animal husbandry (AH) was the most important economic activity in terms of the number of women: four women reported it as primary status activity and 109 women reported it as secondary status activity.

Table 8 shows a cross-tabulation of primary and secondary activities among women in 2010. The key findings are as follows.

1. The principal activity for a majority of women in the villages was “housework.” Out of 371 women, 239 women reported housework as their primary activity. Only 65 women reported economic activities as their primary status activity.
2. Employment opportunities within the village were limited to agriculture – in the form of self-employment in agriculture, agricultural labour, and animal husbandry.
3. MGNREGA work was not regarded as an important economic activity, as most participants reported it as tertiary or fourth (or even lower) status activity. There were 61 participants in 2010, but the number of MGNREGA work participants fell to six in 2015.
4. Animal husbandry was one of the most important economic activities in the three villages in terms of the number of women engaged: there were 178 and 169 women engaged in animal husbandry in 2010 and 2015, respectively.

Using this information, we calculated female WPRs in two ways: the first includes AH and the second excludes it. Table 9 shows WPRs at the all-India level and in West Bengal using NSS and Labour Bureau data, as well as WPRs from the FAS village surveys. According to the EUS report of NSSO, female WPR in West Bengal was low. The rural female WPR at the all-India level was 48.5 per cent in 2004–05, while it was only 25.9 per cent in West Bengal. It is assumed that social restrictions and limited employment opportunities were the main reasons for the lower WPR in West Bengal. During recent decades, female WPR has declined significantly in many States, but has remained at almost the same level in West Bengal. It is likely that poverty compelled women from poor families to work outside the homestead. While wage rates rose substantially in the last decade, it is likely that employment did not see a corresponding rise.

Village survey results (the lowest panel) show that the WPR using primary status was 10.4 per cent in 2010 and 17.5 per cent in 2015, broadly comparable to the NSSO and Labour Bureau estimates, at 14.5 per cent and 18.1 per cent, respectively. A large difference, on the other hand, emerges when we use secondary activity status. The village survey results are now much higher: in 2014–15 it was 18.9 per cent

Table 8 *Women's activities in the FAS study villages, by type of activity, 2010*

Primary Activity	Secondary Activity										
	No secondary activity	Self- employment in agriculture	Agricultural labour	Animal husbandry	Trade	Government service	Self- employment in service	Other service	Housework	Student	All
Self-employment in agriculture			8	6					7		21
Agricultural labour		5		5			1		20		31
Animal husbandry		2	1						1		4
Manufacturing									2		2
Government service					1		1		3		5
Other service			1	1							2
Housework	82	42	14	96		1	1	2		1	239
Student	26	4	3	1		1	1		16		52
Non-worker	13								2		15
All	121	53	27	109	1	2	4	2	51	1	371

Source: FAS village survey data.

Table 9 *Changes in female work participation rate (WPR), 2004–05 and 2015–16 in per cent*

			UPS	USS	UPS + USS	SA01–04	UPSS + SA01–04
All India	NSS	2004–05	35.9	12.6	48.5	20.1	68.6
		2009–10	29	8.2	37.2	26.5	63.7
		2011–12	25	10.3	35.2	26.7	61.9
West Bengal	NSS	2015–16	24.6	5.6	30.2	n.a.	n.a.
		2004–05	14.9	11	25.9	46.1	71.9
		2009–10	12.2	8	20.1	48.1	68.2
	Labour Bureau	2011–12	14.5	11.3	25.8	44.6	70.4
		2015–16	18.1	5	23.1	n.a.	n.a.

Changes in female work participation rate (WPR), in per cent

FAS village data		Primary occupation	Secondary/ tertiary occupation	All	Animal husbandry	Worker + AH
AH included	2009–10	10.4	59	69.4		
	2014–15	17.5	45.8	63.3		
AH separate	2009–10	9.8	30.9	40.7	28.7	69.4
	2014–15	16.4	18.9	35.3	28	63.3

Notes: UPS = usual principal status; USS = usual subsidiary status; SA = specified activity; NSS = National Sample Survey; FAS = Foundation for Agrarian Studies; AH = animal husbandry, n.a. = not applicable.

excluding AH and 45.8 per cent when AH was included. According to the NSSO's estimates, the female WPR (USS) varied from 8 to 11 per cent.⁴

Even excluding animal husbandry, the WPR of USS workers in the FAS village survey was 30.9 per cent in 2010 and 18.9 per cent in 2015, while it was 11.3 per cent in 2011–12 for all West Bengal, according to the NSSO. What is the reason for this large difference? We argue that it is most likely on account of self-employment in agriculture.

If we apply the 30-day criterion of the NSSO for usual subsidiary workers, only 9.6 per cent of women who reported cultivation as their activity would be counted as workers (Table 10). Further, only about one-half of agricultural labourers reported working for 30 days and more. One reason for this could be our standardisation of days into eight-hour days; for example, five hours spent by women on weeding would not get counted as one work-day. It is not clear if the EUS of the NSSO applies standardisation. The concept and definition of the NSSO EUS states that while nominal work is excluded, one hour of work is regarded as half a day for current daily status. Table 10 thus shows the difficulties in capturing the number of days of work and categorising a person as a worker or a non-worker

⁴ Note that the USS WPR of the Labour Bureau is under-reported, as anticipated.

Table 10 *Proportion of women workers in crop cultivation and agricultural labour, by days of work, 2015 in number and per cent*

(A) Crop cultivation work status					
Days of work	Primary status	Secondary status	Tertiary status	All	Percentage
Less than 10	5	23	28	56	50
10–20	4	17	11	32	28.6
20–30	5	3	4	12	10.7
More than 30	6	4	2	12	10.7
Total	20	47	45	112	100

(B) Agricultural labour work status					
Days of work	Primary status	Secondary status	Tertiary status	All	Percentage
Less than 10	1	4	2	7	11.1
10–20	6	7	1	14	22.2
20–30	5	3	2	10	15.9
More than 30	18	12	2	32	50.8
Total	30	26	7	63	100

Note: Standardised to eight working hours per day.

Source: FAS village survey data.

in the case of self-employment, or when working as family help in farming or other household industries.

There could be many persons with apparently nominal work or a limited number of work days that would be categorised as non-workers in the NSSO’s EUS. The EUS also under-reports unemployment among women. Let us suppose that a woman intends to work, or is available for work, but due to lack of employment opportunities she cannot meet the cut-off of 30 days per year to be categorised as a worker. She should then be classified as “unemployed” in usual subsidiary status, but no such category exists in the EUS. Instead, she may be classified as a non-worker with SA01–04 participation. If this is the case, the female WPR should include SA01–04 in defining usual status WPR; that is, we should calculate an augmented WPR as suggested by Kapsos *et al.* (2014), Olsen (2006), and others. The augmented WPRs from the FAS village survey data were 68.2 per cent in 2009–10 and 70.4 per cent in 2011–12. Female WPR including animal husbandry was 69.4 per cent.

The village survey data provide valuable information on animal husbandry, an important element of women’s work participation. Women from the villages participated extensively in animal husbandry. More than 80 per cent of households in all three villages were engaged in animal husbandry, with 81.7 per cent in dairy and 85.2 per cent in goat-keeping. Though some households had two to three female workers, in most cases there was only one female worker in a household. Except for a large dairy, the size of dairying or goat-keeping did not relate to the extent of

Table 11 *Female participation in animal husbandry in the study villages, West Bengal in number*

Number of cows/ buffaloes	All households	Households with women workers	Number of female workers	Number of goats	All households	Households with women workers	Number of female workers
1	56	46	55	1	19	14	15
2	40	34	43	2	25	21	23
3–5	26	21	28	3–5	33	29	39
6–14	4	2	4	6–12	11	11	12
All	126	103	130	All	88	75	89

Source: FAS village survey data.

female participation. Women in rich families were unlikely to commit time to animal husbandry as they were able to hire long-term workers.

Table 12 shows the change in the number of women engaged in animal husbandry by activity status: 178 women (56.1 per cent) and 169 women (45.5 per cent) were engaged in animal husbandry in 2010 and 2015, respectively. Two interesting points emerge. The first relates to the activity status of animal husbandry. Most women did not regard animal husbandry as an “important” activity. Thus, in 2010, only two women reported it as their primary status activity, while 93 women reported it as their secondary activity and 48 women as their tertiary activity. The situation did not change in 2015 with only four women reporting animal husbandry as primary status activity, but 109 women and 92 women reporting it as a secondary or tertiary activity, respectively.

The second point is that participation in animal husbandry is not stable. Out of 178 women engaged in animal husbandry in 2010, 59 women quit the activity and 38 women newly entered it in 2015. Of the 59 women who stopped working in

Table 12 *Change in the number of workers in animal husbandry by activity status, West Bengal villages, 2010 and 2015 in numbers*

Activity status (2015)	Activity status (2010)						New
	No data	Primary	Secondary	Tertiary	Fourth	Sub-total	
Primary		1			2	3	1
Secondary	11		39	25	8	72	26
Tertiary	1	1	19	10	12	42	9
Fourth				1	1	2	2
Sub-total		2	58	36	23	119	38
Exited animal husbandry	42		35	12	12	59	101
All	54	2	93	48	35		139

Source: FAS village survey data.

Table 13 *Primary activity of women engaged in animal husbandry and MGNREGA in number and per cent*

Activity	Animal husbandry		MGNREGA	
	Number	Percentage	Number	Percentage
Self-employed in agriculture	8	5.7	13	22
Agricultural labour	6	4.3	27	45.8
Animal husbandry	n.a.	n.a.	9	15.3
MGNREGA	2	1.4	n.a.	n.a.
Other	2	1.4	2	3.4
Student	4	2.8		0
Housework	119	84.4	8	13.6
All	141	100	59	100

Note: 1. n.a. = not applicable.
2. Women engaged in animal husbandry and MGNREGA as their primary status and fourth status activities are excluded.
Source: FAS village survey data.

animal husbandry, a majority (55.9 per cent) were engaged in housework. Of the remaining, 12 were agricultural labourers, five were self-employed in agriculture, and two reported other employment.

Table 13 tabulates the answers to the following question: what was the primary activity of women who reported participation in either animal-rearing or MGNREGA as secondary or tertiary activity? There is an interesting contrast between workers in animal husbandry and in MGNREGA. The main activity of women who were engaged in animal husbandry was “housework,” with 84.4 per cent of responses, whereas that of MGNREGA participants was “self-employed in agriculture” (22 per cent) and “agricultural labour” (45.8 per cent). In short, an overwhelming majority of animal husbandry workers reported their main activity as housework. Engagement in animal husbandry appears to be an “extension of housework” for a woman. Does this mean that there is only nominal participation in animal husbandry?

Animal husbandry is one of the most widespread activities in the region. According to the village survey results, 177 out of 214 sample households (82.7 per cent) kept some kind of animal (cows/buffaloes, goats, and poultry) in 2015. Table 14 shows the

Table 14 *Distribution of households by size of animal husbandry, study villages, 2015 in number*

Number of cows/buffaloes						Number of goats					
0	1	2	3–5	6–14	All	0	1	2	3–5	6–12	All
88	56	40	26	4	214	126	19	25	33	11	214

Source: FAS village survey data.

distribution of households by size of dairy and goat-keeping in the three villages in 2015.

Out of 214 households, 126 (58.9 per cent) and 88 (41.1 per cent) households kept cows/buffaloes and goats, respectively. The scale of animal husbandry was small: out of 126 milch animal owners, 56 (44.4 per cent) households kept one cow/buffalo, and 40 (31.7 per cent) households kept two cows/buffaloes. Similarly, one-half of all households kept one or two goats.

Another important aspect of animal husbandry in the villages was that small and marginal farmers, and landless manual labour households accounted for a majority of those engaged in animal husbandry. Among the households keeping milch animals, the share of poor peasant and manual labour households was 45.2 per cent and 26.2 per cent, respectively, and together they accounted for 76 per cent of all milch animals. Their shares in goat-keeping were slightly higher, with manual labour households at 44.1 per cent and poor peasant households at 35.2 per cent.⁵

At this scale, production is mostly for home consumption. In 2015, out of 126 households, 86 households had output of milk, but only 19 households (22.1 per cent) sold milk. Average production of milk per year was 438.9 litres per household, and average sale was 430.3 litres per milk-selling household. Of 88 goat-keeping households, 16 households (18.2 per cent) sold goats in 2015. Thus, excluding one big dairy farm with 14 cows/buffaloes, animal husbandry in the three villages in West Bengal was very small in size and mainly for home consumption.

Employment opportunities for women are limited, and there are social and cultural restrictions on females working outside the village. Under such circumstances and given its limited resource requirements, animal husbandry is regarded as a suitable household undertaking. Cows/buffaloes are kept in the compound of the household with or without a cow-shed, and are fed paddy straw and grass collected by women. Most of the work is done by female members of the household. Thus, animal husbandry in the village is seen as one of the survival strategies for a poor family. Production is very small, at about 430 litres of milk per household, which is valued at around Rs 10,000 per year. Milk or eggs are sold if there is a surplus over home consumption. However small the value of production from animal husbandry is, it is an economic activity that requires careful evaluation. Time-use surveys clearly show that taking care of animals is not nominal work (Swaminathan *et al.* 2018). Categorising work in animal husbandry (AH) as a specified activity and female participants in AH as non-workers involves a serious error of under-assessment of women's participation in economic activity.

⁵ Tables available on request.

CONCLUDING REMARKS

Although the National Sample Survey Organisation (NSSO) includes a category of specified activities – namely, maintaining a kitchen garden, animal-rearing, free collection of fodder and firewood – as economic activities, this category is not included in the estimation of usual principal and subsidiary status workers. This is mainly because the work is nominal or the number of workdays is less than 30 in a year. When we examine the relationship between the proportion of usual subsidiary status workers and specified activity participants (SA02 animal husbandry), issues of measurement cannot be excluded. From the point of view of conceptual validity and to prevent possible measurement errors, it is preferable instead to calculate an augmented worker-population ratio or work participation rate by including the category of specified activities (i).

The methodology followed by the NSSO's Employment and Unemployment Survey and by the Labour Bureau appears similar and a comparison may be possible, at least at an all-India level, which allows us to extend the trend of female worker population ratios in rural India to 2015–16, despite an underestimation of USS workers in the Labour Bureau data of 2015–16. The decline of female worker population ratios from 2004–05 has continued up to 2015–16.

Village survey data from the Foundation for Agrarian Studies show that female employment opportunities outside the village are few, with most opportunities limited only to agriculture. This is the background for the very low level of female worker-population ratio in West Bengal. Animal husbandry is an important activity in terms of the participation of women in the villages. The survey data clearly show that a majority of, if not all, female workers engaged in animal husbandry are participants in the survival strategies of poor marginal and landless households. We argue that worker-population ratio (WPR) including animal husbandry or WPR (usual principal and subsidiary status + specified activity participation rate) in the NSSO's Employment and Unemployment Survey is more appropriate for measuring women's participation in economic activities than WPR (usual principal and subsidiary status) alone.⁶

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⁶ A question for future study could be whether the pursuit of small-scale animal husbandry for home consumption can be regarded as "labour market participation."

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ABBREVIATIONS

AH	Animal Husbandry
EUS	Employment and Unemployment Survey
FAS	Foundation for Agrarian Studies
ISNA	Indian System of National Accounts
LFPR	Labour Force Participation Rate
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
NIC	National Industrial Code
NSS	National Sample Survey
NSSO	National Sample Survey Organisation
PARI	Project on Agrarian Relations in India
SA	Specified Activity
SC	Scheduled Caste
SNA	System of National Accounts
SSS	Second Stage Strata
ST	Scheduled Tribe
UN SNA	United Nations' System of National Accounts
UPS	Usual Principal Status
UPSS	Usual Principal and Subsidiary Status
USS	Usual Subsidiary Status
USU	Ultimate Stage Unit
WPR	Worker Population Ratio

Appendix Table 1 *Employment structure in the three villages of West Bengal, by primary and secondary status activity and gender, 2015*
 (A) *Primary and secondary status activities, males, 2015*

Primary activity	Secondary activity															
	No secondary activity	Self-employment in agriculture	Self-employment in fishery	Agricultural labour	Animal husbandry	Manufacturing	Construction	MGNREGA	Trade	Transport	Self-employment in service	Other service	House work	Student	Non-worker	All
Self-employment (agriculture)	21			40	28	4	3	4	17	2	3	3				125
Self-employment (fishery)		5														5
Agricultural labour	13	16		1	8		11	1	4	1		1	1			57
Animal husbandry	3	1		1												5
Manufacturing	8	3								1				1		13
Construction	11	8	1								1	1				22
MGNREGA													1			1
Trade	17	13		3	3				1		1					38
Transport	2	2														4
Government service	10	2													1	13
Self-employment (service)	4	2														6
Other service	6	3		1		1			5					1		17
Unemployed	2															2
Housework	1															1
Student	19	17		3	3				1	1		1				45
Non-worker	13				1										1	15
No data	3															3
All	133	72	1	49	43	5	14	5	28	5	5	6	2	2	2	372

(B) Primary and secondary status activities, females, 2015

Primary activity	Secondary Activity										
	No secondary activity	Self-employment in agriculture	Agricultural labour	Animal husbandry	Trade	Government service	Self-employment in service	Other service	Housework	Student	All
Self-employment (agriculture)			8	6					7		21
Agricultural labour		5		5			1		20		31
Animal husbandry		2	1						1		4
Manufacturing									2		2
Government service					1		1		3		5
Other service			1	1							2
Housework	82	42	14	96		1	1	2		1	239
Student	26	4	3	1		1	1		16		52
Non-worker	13								2		15
All	121	53	27	109	1	2	4	2	51	1	371

(C) Secondary and tertiary status activities, females, 2015

Secondary	Tertiary							All
	No tertiary activity	Self-employment in agriculture	Agricultural labour	Animal husbandry	MGNREGA	Other service	Housework	
No secondary activity	121							121
Self-employment in agriculture	22		4	22	2		3	53
Agricultural labour	2	4		14		1	6	27
Animal husbandry	60	41	1		1		6	109
Trade	1							1
Government service	2							2
Self-employment in service	3						1	4
Other service			1	1				2
Housework	29	4	2	15	1			51
Student	1							1
All	241	49	8	52	4	1	16	371