



## Research Article

# SUPPLY-DEMAND GAP OF WOMEN WORKERS IN AGRICULTURE

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**Abstract:** The study was conducted to know the employment opportunities of women workers in agriculture by analysing the supply - demand gap of women workers participating in various agricultural operations in Prakasam district of Andhra Pradesh. Tabular analysis using descriptive statistics was done to achieve the objective. The supply and demand of women workers in agriculture were calculated in terms of man days. The results showed that the supply of women workers was greater than the demand for them in the selected villages, which proves that there exists a larger unemployment of the women workers in agriculture. Hence it is suggested that there should be alternate employment sources for the women workers by promoting agro based industries in the rural areas.

**Keywords:** Women workers, Agriculture, Supply-demand gap, Man days

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## Introduction

In India, agriculture is considered as the main occupation, which contributes about 16.5 percent of Gross Domestic Product (GDP) and 55 percent of the country's total workforce [1]. In 2011, for the first time since India became an independent country, the proportion of agricultural labourers exceeded the proportion of cultivators *i.e.*, approximately from 28 percent in 1951 to 57 percent in 2011 of agril labourers to total persons engaged in agriculture in 1951 [2], signifying a shift from livelihood farming to commercial cultivation.

Women constitute 48.53 percent of the general population of India and agricultural sector was the largest employer of women [3]. Employment in agriculture in India was reported at 42.38 percent of total employment in 2019, with female employment of 54.54% and male employment of 39.33 percent which proves that women constitute the major component of human labour in agriculture [4].

In Andhra Pradesh, of the total population of 8.46 crores, total female population percentage was about 49.82 percent, as against 48.53 percent (as per 2011 census) at national level. In Andhra Pradesh there was an increase in total women agricultural labourers from 71,79,601 persons in 2001 to 88,37,732 persons in 2011 census year [5]. In addition, the shift of men out of agriculture has led to an increase of women's share of the agricultural workforce and an expansion of their role in the agricultural sector.

However, the participation of women in agricultural sector is generally limited to less skilled jobs, when compared to the workforce constituted by men, with many women engaged as unpaid subsistence workers. An estimated 52-75% of Indian women engaged in agriculture are illiterate, which prevents them from occupying higher skilled jobs or moving to the non-farm sector [6].

Keeping in view the importance of women participation in agriculture the present study about the "Supply - demand gap of women workers in agriculture" was conducted to know the employment opportunities of women workers in agriculture.

## Objectives

1. To assess the employment opportunities of women workers in agriculture and
2. To analyse the supply-demand gap of women workers in agriculture

## Material and Methods

A multi stage sampling technique was followed. The study was conducted in twelve villages of Prakasam district, by selecting two villages from each of the six mandals selected from three revenue divisions viz., Ongole, Kandukur and Markapuram divisions of Prakasam district of Andhra Pradesh state. Five farmers from each of the selected villages were randomly selected, thus comprising a total of 60 farmers from twelve villages. Three common crops among the first five major crops having highest area in the two mandals selected under each division were considered for the present study. Thus, in Ongole division maize, cotton and chilli were selected. In Kandukur division red gram, rice and cotton were selected, while in Markapuram division red gram, cotton and chilli were selected. The data regarding the requirement of women workers in agriculture for each of the selected crops was collected from the farmers, whereas secondary data pertaining to the total agricultural labourers in each of the selected village was obtained from the Primary Census Abstract (PCA) data- Andhra Pradesh for the year 2018-19. The crop wise data in each village was collected from the respective Village Agricultural Assistants and Agricultural Extension Officers in Prakasam district.

## Data Analysis

Tabular analysis using descriptive statistics was used to analyse the collected data regarding supply and demand of women workers in agriculture.

## Supply of women workers in agriculture

The supply of women workers in each village was calculated in terms of man days, by following the procedure given here under.

The secondary data on total agricultural labour population in the village was considered as potential agricultural labour population (16 to 60 years of age) for the study. The potential agricultural labour population in each village was multiplied with the number of man days in an agricultural year depending upon the cropping pattern followed to obtain the total man work days available in the village. For single cropped area, the man days are 120 to 140 days (average 130 man days), while for double cropped area or inter cropped area the man days are 180 to 200 days (average 190 man days).

Table-1 Village-wise supply of agricultural women workers

Mandal	Village	(1) Total agricultural workers (No.)	(2) Supply of agricultural workers (MWDS)	(3) Supply of women workers in agriculture (MWDS) (2)*3/5	(4) Supply of women workers in agriculture/ acre (MWDS)
Martur	Martur	3641.00	691790.00	415074.00	294.38
	Dronadula	2671.00	507490.00	304494.00	106.47
	Total	6312.00	119928.00	719568.00	400.85
Santhamaguluru	Santhamaguluru	3338.00	634220.00	380532.00	589.97
	Elchuru	3377.00	641630.00	384978.00	1124.02
	Total	6715.00	1275850.00	765510.00	1714.00
Darsi	Darsi	4023.00	764370.00	458622.00	78.34
	East Choutupalem	1424.00	270560.00	162336.00	171.24
	Total	5447.00	1034930.00	620958.00	249.58
Mundla muru	Edara	1406.00	267140.00	160284.00	130.84
	Kellem Palle	1284.00	243960.00	146376.00	82.47
	Total	2690.00	511100.00	306660.00	213.31
Pullala cheruvu	Pullalacheruvu	3434.00	446420.00	267852.00	98.87
	Chapalamadugu	2759.00	358670.00	215202.00	71.54
	Total	6193.00	805090.00	483054.00	170.42
Tripuran thakam	Kankanala Palle	2659.00	345670.00	207402.00	186.85
	Dupadu	2638.00	342940.00	205764.00	254.34
	Total	5297.00	688610.00	413166.00	441.19

In the villages selected in Ongole and Kandukur divisions double cropped pattern was followed and hence the average man days was taken as 190 man days per agricultural year, while in the villages selected in Markapuram division only single cropped season with either red gram, cotton or chilli was followed and hence an average of 130 man days per agricultural year was considered for the study. The proportion of the women workers in each village was calculated as 3/5th (male- female ratio of 2:3) of the total man days arrived per agricultural year. Thus, the supply of women workers in man days was obtained in each of the village under study. The per acre supply of women workers in agriculture in the study area was obtained by dividing the total supply of women workers with the total area under the selected major crops in each of the village under study.

#### Demand for women workers in agriculture

The demand for the women agricultural workers was obtained in the following manner. The women workers required per acre for each of the operation in the crops selected in each village were collected in terms of man-days from the farmer respondents for the whole crop period in an agricultural year. Per acre demand of women workers for the selected crops in each village was obtained by totalling the demand for all operations of respective crop. The demand for women workers in terms of man days per acre for each crop was multiplied with the total area of the respective crops present in the selected village to obtain the total demand of women labourers in man days for all the selected crops. The demand for women workers in the village was calculated by adding up the demand for the women workers in each crop in the village. Per acre demand of women workers in the villages was obtained by dividing the total demand with the total area under all selected crops in the village.

#### Supply - demand gap of women workers in agriculture

The supply-demand gap of women workers in agriculture can be estimated by calculating the difference between the supply of women labourers in each village and the demand for the women labourers in the same village in terms of man-days.

#### Results and Discussion

##### Supply of women workers in agriculture

The supply of agricultural workers as presented in [Table-1] was highest in Darsi village with 764370-man days followed by Martur village with 691790 man days, Elchuru village with 641630 man days, Santhamaguluru village with 634220 man days and Dronadula village with 507490 man days. In Pullalacheruvu and Chapalamadugu villages the supply of agricultural workers was 446420- and 358670-man days respectively, where as in Kankanala Palle and Dupadu villages it was 345670 and 342940man days respectively. The supply of agricultural

workers was least in Kellem Palle, Edara and East Choutupalem villages with 243960, 267140 and 270560 man days respectively. The total supply of women workers was highest in Darsi village with 458622man days followed by Martur village with 415074 man days and in Elchuru village the supply of women workers was 384978 man days. In Santhamaguluru village the supply of women workers was 380532-man days and 304494man days in Dronadula village. In Pullalacheruvu village the supply of women workers was 267852man days, while in Chapalamadugu village it was 215202man days. In Kankanala Palle and Dupadu villages the supply of women workers was 207402 and 205764man days respectively. Among the selected villages the supply of women workers was least in Kellem Palle followed by Edara and East Choutupalem villages with, 146376, 160284 and 162336man days respectively. The variation in total supply of agricultural workers was also reflected in the supply of women workers in the selected villages, as 3/5th of total agricultural labourers was considered for arriving at the total women workers in selected villages. Among the selected mandals the highest supply of women workers was observed in Santhamaguluru mandal with 765510 man days followed by 719568 man days in Martur mandal and Darsi mandal with 620958 man days. In Pullalacheruvu and Tripuranthakam mandals the supply of women agricultural workers was 483054 and 413166 man days respectively. The least supply of women workers was observed in Mundlamuru mandal with 306660 man days.

#### Demand for Women Workers in Agriculture

The demand for the women workers was calculated by estimating the requirement of women workers for different agricultural operations involved in each crop in the study area. The major crops viz., chilli, cotton, maize, rice and red gram were considered for the analysis in the study area. Among the selected major crops, the crops grown by the sample respondent farmers for the selected villages are shown in [Table-2]. As the crops were selected district wise based on the highest area, some crops which were highest in area in the district were not cultivated in some of the selected villages of the district. For example, in Darsi village rice crop was grown in rabi and red gram crop was grown in *kharif*. Cotton was not grown in Darsi village but in Darsi mandal the crops selected were rice, red gram and cotton based on the highest area among the top five crops in the mandal. The same happened with the East Choutupalem and Kellem Palle villages, where only rice and red gram were grown, while cotton was not cultivated in the village. In some villages such as Santhamaguluru, cotton and chilli were grown as major crops, while, maize and rice were grown only when the Nagarjunasagar project (NSP) canal water is available.

#### Village-wise demand for women workers in agriculture

The village-wise demand for agricultural women workers is presented in [Table-2], according to which the total demand for women workers was highest in Dronadula

Table-2 Major crops grown and major crops selected in the sample villages

SN	Village	Major crops grown in the village	Major crops selected for the study
1	Martur	Maize, cotton and chilli	Maize, cotton and chilli
2	Dronadula	Maize, cotton and chilli	Maize, cotton and chilli
3	Santhamaguluru	Maize, cotton and chilli	Maize, cotton and chilli
4	Elchuru	Maize, cotton and chilli	Maize, cotton and chilli
5	Darsi	Rice, red gram	Red gram , rice, cotton
6	East Choutupalem	Rice, red gram	Red gram , rice, cotton
7	Edara	Rice, red gram, cotton	Red gram , rice, cotton
8	Kellem Palle	Rice, red gram	Red gram , rice, cotton
9	Pullalacheruvu	Red gram, cotton, chilli	Red gram, cotton, chilli
10	Chapala Madugu	Red gram, cotton, chilli	Red gram, cotton, chilli
11	Kankanala Palle	Red gram, cotton, chilli	Red gram, cotton, chilli
12	Dupadu	Red gram, cotton, chilli	Red gram, cotton, chilli

Table-3 Village wise demand for agricultural women workers (MWDS)

SN	Villages	Total area of the selected crops (acres)	Total demand for women workers	Demand for women workers/ acre
1	Martur	1410	15301.40	10.85
2	Dronadula	2860	23687.50	8.28
3	Santhamaguluru	645	5993.44	9.29
4	Elchuru	342.5	3404.18	9.94
5	Darsi	5854	9173.40	1.57
6	East Choutupalem	948	2711.50	2.86
7	Edara	1225	3954.00	3.23
8	Kellem Palle	1775	4297.50	2.42
9	Pullalacheruvu	2709	13529.70	4.99
10	Chapalamadugu	3008	17277.40	5.74
11	Kankanala Palle	1110	7477.25	6.74
12	Dupadu	809	3778.58	4.67

Table-4 Supply-Demand gap of women workers in agriculture (MWDS/acre)

Villages	Supply of women workers -1	Demand for women workers -2	Supply-demand gap (1) - (2)
Martur	294.38	10.85	283.53
Dronadula	106.47	8.28	98.19
Santhamaguluru	589.97	9.29	580.68
Elchuru	1124.02	9.94	1114.08
Darsi	78.34	1.57	76.77
East Choutupalem	171.24	2.86	168.38
Edara	130.84	3.23	127.61
Kellem Palle	82.47	2.42	80.05
Pullalacheruvu	98.87	4.99	93.88
Chapalamadugu	71.54	5.74	65.80
Kankanala Palle	186.85	6.74	180.11
Dupadu	254.34	4.67	249.67
Average	265.78	5.88	259.90

village with 23987.50 man days followed by Chapalamadugu village with 17277.38 man days and Martur village with 15301.38 man days. In Pullalacheruvu village the total demand for women workers was 13529.73 man days and in Darsi village the demand was 98173.40 man days. In Kankanala Palle village and Santhamaguluru village the demand for women workers was 7477.25 man days and 5993.44 man days respectively. In Kellam Palle village the demand for women workers was 4297.50 man days. The least demand for women workers was observed in East Choutupalem village with 2711.50 man days followed by 3404.08 man days in Elchuru village, 3778.58 man days in Dupadu village and 3954.00 man days in Edara village. The per acre demand for women workers was highest in Martur village with 10.85 man days followed by Elchuru with 9.94 man days, Santhamaguluru village with 9.29 man days, Dronadula village with 8.28 man days, and Kankanala Palle village with 6.74 man days.

The demand for women workers was 5.74 man days/ acre in Chapalamadugu village, while it was 4.99 man days/ acre in Pullalacheruvu village. In Dupadu and Edara villages the demand for women workers was 4.67 man days and 3.23 man days per acre. The demand for women workers was least in Darsi village with 1.57 man days followed by Kellem Palle village with 2.42 man days per acre and East Choutupalem with 2.86 man days per acre.

The total demand of women workers was highest in the areas where the crops such as chilli and cotton were grown as the requirement of women workers would be more for harvesting operation which would be done multiple times in a crop period. The demand of women workers was least in the villages where rice and

red gram were grown as they were grown in single cropped area in an agricultural year in the selected villages and also the operations that are done by women workers were also less in these crops as compared to other crops. The total demand of the women workers and the per acre demand of women workers did not follow any trend in the selected villages as the demand was mainly dependent on the operations done by the women workers in the particular crop grown in the villages.

Even though the cropped area and total demand of women workers in Darsi was higher, the per acre demand of women workers was least as rice and red gram crops require less women man days when compared to other crops. However, in Santhamaguluru village, the total area of the crops selected was least but the per acre demand was higher and so the higher total demand of women workers in the village. Whereas in Edara and East Choutupalem villages the per acre demand and the total demand of the women workers were on par with the area of the crops in the villages. In Kellem Palle village even though the total area of the selected crops was highest, per acre demand and total demand of women workers was lesser because of the crops grown i.e. rice and red gram which demand less women workers. In Chapalamadugu village, the total demand of women workers and the area of the crops selected were highest and the per acre demand of women workers was of medium range because of the crops like chilli and cotton demand more women workers for multiple times harvesting in the village. The remaining villages followed a comparable trend in demand for women workers and the area of the crops cultivated in the village.

### Employment Opportunities of Women Workers in Agriculture- Estimating the Supply- Demand Gap

The supply and demand gap of the women workers in agriculture per acre is depicted in [Table-3]. The highest gap between supply and demand was found in Elchuru village with 1114.08 man days followed by 580.68 man days in Santhamaguluru village. In Martur and Dupadu villages the supply-demand gap was 283.53 and 249.67 man days respectively. The supply was more than demand with 180.11 man days in Kankanala Palle village, 168.38 man days in East Choutupalem village, 127.61 man days in Edara, 98.19 man days in Dronadula and 93.88 man days in Pullalacheruvu village. The gap was found least in Chapalamadugu village with 65.80 man days followed by Darsi village with 76.77 man days and Kellem Palle in 80.05 man days. Even if the supply was highest in some villages, the gap was less between supply and demand because of the high demand of women workers in those villages. Among the selected villages the supply-demand gap was lesser in the villages like Pullalacheruvu, Kellem Palle and Chapalamadugu where high women labour intensive crops like chilli and cotton were cultivated. When compared with Darsi village, Chapalamadugu has less supply of women workers but has more demand than Darsi village and hence the gap was less in Chapalamadugu than Darsi village. On an average there was 259.90 man days surplus of women workers in all the selected villages, which shows large unemployment of the women workers in agriculture in the district.

The supply of women workers in agriculture per acre was highest in Elchuru village with 1124.02 man days followed by Santhamaguluru village with 589.97 man days, Martur village with 294.38 man days and Dupadu village with 254.34 man days. In Kankanala Palle village the supply of women workers was 186.85 man days/ acre, while it was 171.24 man days and 130.84 man days / acre in East Choutupalem and Edara villages. In Dronadula and Pullalacheruvu villages the supply of women workers was 106.47 and 98.87 man days/ acre respectively. The least supply of women workers was observed in Kellem Palle village with 82.47 man days/acre, Darsi village with 78.34 man days/ acre and Chapalamadugu village with 71.54 man days/ acre. The total supply of women workers was depended on MWDS/ agricultural year and the number of agricultural workers in the village. The total supply of women workers was highest for those villages with double cropped season i.e. 190 MWDS/ agricultural year and also with highest agricultural workers (Darsi and Martur villages). In Pullalacheruvu village even though the number of agricultural workers was highest, the supply of women workers was low as there was single cropped season with 130 MWDS/ agricultural year in the village with red gram/ cotton/chilli crops. Even though East Choutupalem, Edara and Kellem Palle villages were double cropped areas with 190 MWDS/ agricultural year, the agricultural women workers were least and hence the supply of women workers in agriculture was least in those villages. In Darsi village, even though the supply of women workers was higher, per acre supply of women workers was least because of the highest cultivated area under selected crops. Whereas in Elchuru village the supply of women workers was higher but the area of total crops was least and hence there was higher supply of women workers per acre in the village. Though there was a considerable total area of the crops in Kellem Palle village the total supply of women workers was less and so also the supply of women workers per acre. In Santhamaguluru village the total area under the crops was least but the total supply of women workers and also the per acre supply of women workers was highest showing that there would be more than sufficient requirement of women workers in the village. In Chapalamadugu village the area of the crops was highest and hence the supply of women workers per acre was least which showed that the available supply of women man days were nearly engaged by the total cropped area in the village. In almost all the villages the area of the crops selected and the supply of women workers per acre were inversely proportional unless the total supply of women workers was high in the villages with more area of the selected crops.

### Conclusion

The total supply of women workers was depended on MWDS/ agricultural year and the number of agricultural workers in the village. The total supply of women

workers was highest for those villages with double cropped season i.e. 190 MWDS/ agricultural year and also with highest agricultural workers. In almost all the villages the area of the crops selected and the women workers per acre are inversely proportional unless the total supply of women workers was high in the villages with more area of the selected crops. The total demand for the women workers in each of the village was dependent on the area of the crops selected in the villages. The higher the area of the selected crops, higher was the demand for women workers in the village to meet the requirement of the agricultural operations. The total demand of women workers was highest in the areas where the crops such as chilli and cotton were grown as the requirement of women workers would be more for harvesting operation done for multiple times in a crop period. The demand of women workers was least in the villages where rice and red gram crops were grown as they were grown in single cropped area in an agricultural year in the selected villages and also the operations done by women workers as compared to other crops. On an average there was 259.90 man days surplus of women man days in all the selected villages, which shows a larger unemployment of women workers in agriculture in the district.

### Suggestions

In the study area, the surplus availability of women workers could be absorbed by promoting allied agricultural activities like poultry farming, goat rearing, dairy farms, pisciculture, etc. Establishment of agro-based industries could help many of the women to get better employment opportunities.

**Application of research:** To encourage the women in various fields and make them now about the various opportunities in agriculture and allied activities so as to increase the standard of living of women workers mainly in rural areas.

**Research Category:** Agricultural Economic

**Abbreviations:** MWDS: Man Working Days, WW: Women Workers

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**Cultivar / Variety / Breed name:** Nil

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**Ethical approval:** This article does not contain any studies with human participants or animals performed by any of the authors.

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