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Nutritional Status and Socio-Economic Profile of Farm Women in Aspirational Districts of Tamil Nadu

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Aim: "Women in agriculture" is a widely discussed arena but nutrition of women in agriculture is yet to be explored thoroughly. The current paper focuses on farm women in aspirational districts. These are the districts identified by NITI Aayog which are the poorly performing in a state in various developmental dimensions. Hence, the current paper aims at understanding the nutritional status and socio- economic profile of farm women in these districts assuming their higher vulnerability to malnutrition.
Study Design: Survey design was used for the current study.
Place and Duration of Study: The study was conducted in Tamil Nadu from 2018 -2022 as part of PhD research work, affiliated to National Dairy Research Institute.

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Methods: Virudhunagar and Ramanathapuram are the two districts identified as aspirational districts in Tamil Nadu. From each district, two blocks were randomly selected. Two villages were selected from each block randomly and 10 farm women from households having at least 2 milch animals and cultivating for atleast on crop season were selected from each village purposively. Hence a total of 8 villages and 180 farm women of reproductive age (18-49yrs) were included in the sample. Mean dietary diversity Score and Body Mass Index were taken as indicators for nutritional status of farm women.

Results: It was found that a 49.44% of the farm women had only 4 food groups in the last 24 hours followed by 28.89 percent with 5 to 6 food groups and 21.67 percent with 7 to 10 food groups. Only 41.67 percent of the respondents had BMI in the normal range. Around 30 percent of the farm women were underweight, 20 percent were overweight and 8 percent of them were obese. The results call for immediate attention and interventions for ensuring nutritional security of farm women in general and aspirational districts in particular.

Keywords: Nutrition security; BMI; MDD-W; farm women; aspirational districts; Tamil Nadu.

1. INTRODUCTION

Women in India spend about 32 percent of their time on agricultural activities and on an average 300 minutes per day in unpaid care and domestic work [1]. About 80 percent of farm work is performed by women in India. The adverse effect of this labor on the health and nutrition of farm women is yet to be fully explored [2]. Despite having a significant impact on dietary diversity and being in charge of household nutrition, women are nonetheless more likely than males to be undernourished [3]. The gender divide makes things worse. India placed 135th out of 149 nations in the World Economic Forum's assessment of the global gender gap [4]. Being empowered in the agricultural sector is associated with better nutritional status, according to recent research seeking to identify the association between WEAI scores and nutrition-related factors (such as per capita calorie availability, dietary diversity, and adult BMI) [5,6]. Indian women are particularly at risk of being too malnourished. Rural women consumed 1853 kcal per person per day on average, which is 16.71% less than the recommended daily allowance (2225 kcal), and also they consumed less protein, iron, and ascorbic acid in their diets than is advised [7]. A third of women of reproductive age in India are undernourished, with a body mass index (BMI) of less than 18.5 kg/ m2 and more than half of all Indian women develop anaemia due to lack of essential nutrients [8]. The latest Global Nutrition Report highlighted that 48% of rural Indian women in the reproductive age group are anaemic (IFPRI 2016). This figure stood even higher at 54% in NFHS-4 [8]. Maternal under nutrition, is a grave public health concern because its implications extend well beyond the individual herself. Maternal under nutrition contributes to foetal growth restriction, which increases the risk of neonatal deaths and, for surviving children, of stunting [9]. According to research by Dahiya and Viswanathan [10], women who work in agriculture tend to have lower average BMIs than those who do not. The average BMI is lower among non-agricultural labour than it is among agricultural labour, nonetheless. Those who work in agriculture have it worse than those who are farmers. According to the diets of rural households, agricultural development may have increased calorie consumption at the expense of protein and micronutrient intake. This results in a limited beneficial influence of agriculture on the diversity and adequacy of household diets [11]. Among the reasons advanced for the poor nutritional status of Indian women, an enduring explanation relates to the intra-household status of women. Several indicators of women's status in the literature consistently rank women in the countries of South Asia as lower in comparison to their counterparts in Asia, Africa, Latin America and the Caribbean [12]. The health, nutrition, and capacity to breastfeed and care for children of women may be severely impacted by excessive agricultural workloads, pathogen exposure, and child care responsibilities [13,14]. Also, studies show that socio-economic background determines nutritional adequacy. Worku et al. [15] show that household income is one of the key determinants of access to food in Ethiopia. With economic growth, household incomes may rise, and this may lead to improved access to nutritious food. Evidence also suggests that access to market and nutrition knowledge of the consumer improves consumption of more diverse diets [16-18]. To ascertain the total consequences of agricultural on women's

nutrition, empirical study is thus required. The situation in India is particularly unusual in that aspects of the family structure and cultural norms that define interpersonal hierarchies promote low social status among women, which has a long-term negative impact on both the woman's and her child's health. Given that women play a large role in family structure, it is not surprising that many studies assert that women's empowerment is a crucial approach for agricultural programmes to have a nutritional impact [19,20]. Women who are empowered have better nutrition, greater familial influence, agency over how they spend their time, and are better able to prioritise different activities [21,22].

2. RESEARCH METHODOLOGY

The study was conducted in aspirational districts of Tamil Nadu viz. Ramanathapuram and Virudhunagar as Tamil Nadu had highest number of female labour force in agriculture and aspirational districts were lagging behind in the nutritional domain in particular [23]. From each district, two blocks were randomly selected. Two villages were selected from each block randomly and 10 farm women from households having at least 2 milch animals and cultivating for atleast on crop season were selected from each village purposively. Hence a total of 8 villages and 180 farm women of reproductive age (18-49yrs) were included in the sample. Mean dietary diversity Score and Body Mass Index (BMI) were taken as indicators for nutritional status of farm women. According to the FAO a woman should have at least 5 food groups per day out of the 10 food groups listed by them, to have adequate nutrition. MDD-W equaled 1 if the women consumed at least 5 different food groups out of the 10 food groups proposed for calculation of the minimum dietary diversity for women of reproductive age and 0 otherwise [24]. It is a valid proxy measure for micro nutrient adequacy of women [25]. The categories of BMI are underweight (BMI is less than 18.5), normal (18.5 to <25), overweight (BMI is 25.0 to <30), and obese (BMI is 30.0 or higher). The socioeconomic profiling of the farm women is done using 16 variables and further presented using descriptive statistics.

3. RESULTS AND DISCUSSION

3.1 Nutritional Status

3.1.1 Body Mass Index (BMI)

Out of the total respondents only around 41 percent of the farm women were having normal BMI. Around 30 percent of the respondents were underweight in total and 21 percent were overweight (Table 1). Obesity was around 8.33 %. Similar results were reported by Seshadri, 2009. BMI being a proxy indicator of nutritional status of an individual at a given point of time, is very important to be at the normal range as non-normal BMI make as an individual prone to many non-communicable diseases and associated health risks. As nearly half of the farm women under this study were not having normal BMI, this implies these women are malnourished.

Table 1. Body mass index of farm women

Body Mass Index (BMI)	Frequency (%)
Underweight	53 (29.44)
Normal	75 (41.67)
Over weight	37 (20.56)
Obese	15(8.33)

3.1.2 Mean Dietary Diversity for Women of reproductive age (MDD-W)

According to the FAO a woman should have at least 5 food groups per day out of the 10 food groups listed by them, to have adequate nutrition. But a nearly half of the respondents (49.44%) had only 4 food groups in the last 24 hours followed by 28.89 percent having 5 to 6 food groups and 21.67 percent having 7 to 10 food groups (Table 2). This implies that most of the respondents had poor dietary diversity. This is consistent with the results of a study conducted in Karnataka [26] which revealed that most women consumed 5 of 9 food groups, with about 30% of them consuming fewer food groups.

Table 2. Mean dietary diversity for women of reproductive age (MDD-W)

Mean Dietary Diversity of Women of reproductive age (MDD-W)	Frequency (%)
Up to 4 food groups	89 (49.44)
5-6 food groups	52 (28.89)
7-10food groups	39(21.67)

3.2 Socio-economic Profile of Farm Women

3.2.1 Age

Women of reproductive age are selected as the respondents for the study. According to ICMR, women from the 15 to 49 years are categorized in reproductive age. The highest numbers of respondents (37.78 %) were falling in the age category of 26-38 years. This was followed by 33.33 percent of the women falling in the 39-49 age category and 28.89 percent in the 15-25 age category (Table 3).

3.2.2 Education

Primary, middle school, secondary and higher secondary classes had around equal proportion of respondents. Only few respondents (15%) had graduate and above education out of the total respondents (Table 3).

3.2.3 Family size

Most of the respondents had medium family size with 4-6 members in the family (52.78%). Also, 24.44 percent had high family size (7 or more members) and 22.78 percent of the respondents had small family size (up to 3 members) (Table 3). Large family size were found to have a negative correlation with food security [27].

Table 3. Age, Education and Family size of the respondents

Socio-demographic variables	Frequency (%)
Age	
15-25	52 (28.89)
26-38	68 (37.78)
39-49	60 (33.33)
Education	
Primary	43 (23.89)
Middle School	41 (22.78)
Secondary	39 (21.67)
Higher Secondary	30 (16.67)
Graduate and Above	27 (15.00)
Family size	
Low (Up to 3 members)	41 (22.78)
Medium (4-6 members)	95 (52.78)
High (Above 7 members)	44 (24.44)

3.2.4 Annual income

Nearly 40 percent of the total respondents had low income of around Rs. 182000 per year as indicated in Table 4. Around 43.33% were in the middle income category and only 17 percent of the total respondents were in the high income category earning around Rs. 650000 per annum. Biswas et al. [28] report that wealth quantile shows the maximum impact on nutritional health among women.

3.2.5 Off-farm income sources

A higher proportion (71.67%) of the farm women did not have any off farm income sources. The two major off-farm income sources identified in which the remaining 28.33 percent of the farm women are engaged were casual wage labour and self-employment (Table 4). 17 percent of the farm women were engaged in self-employment activities like basket making, textile selling, tailoring etc. The casual wage labour activities were taken up during off-season by nearly 11 percent of the farm women.

3.2.6 Annual off-farm income

In general farm women earned around Rs. 36000 to 182000 per annum from off-farm sources (Table 4). Around 10 percent of the total farm women earned Rs. 36000 to 60000 annually, followed by 11.67 percent earned Rs. 61000 to 120000 per annum and 6.11 percent earned more than Rs. 120000 annually.

3.2.7 Landholding size

Majority of the respondents (70.56%) were marginal farmers having a landholding below 1 hectare (Table 4). There were no farm women in medium and large category. Among the total farm women 26.67 percent were small farmers with landholding of 1-2 hectares and 2.78 percent were semi-medium farmers with landholding of 2-4 hectares.

3.2.8 Crop variety score

A higher proportion of the total households had low to medium crop variety score followed by high score (Table 4). Nearly 48 percent of the respondents had low crop variety core followed by medium (38.33 %) and high score (14.44 %). This implies that crop diversity is lower in Tamil Nadu. This result is consistent with the results reported by Kavitha et al. [29].

3.2.9 Herd size

In Tamil Nadu a greater majority (67.78 %) of the farm women had low herd size with 2-4 animals

followed by medium (27.78 %) with 5-7 animals and high (4.44 %) herd size with more than 8 animals (Table 5). The study revealed that all the farm women are dependent on livestock as a major source of income.

Table 4. Annual income, off-farm income, landholding and crop variety score of the respondents

Socio-demographic variables	Frequency (%)
Annual income	
Low (75000-182709)	84 (39.44)
Medium (182710-392028)	42 (43.33)
High (392029-650000)	54 (17.22)
Off-farm income sources	
No	129 (71.67)
Casual wage labour	20 (11.11)
Self-employment	31 (17.22)
Annual Off-farm Income (Rs.)	
Low (36000-60,000)	18(10.00)
Medium (61000-120000)	21 (11.67)
High (121000-182000)	12 (6.11)
Landholding (Ha)	
Marginal (below 1Ha)	127 (70.56)
Small (1-2 Ha)	48 (26.67)
Semi-medium (2-4Ha)	5 (2.78)
Crop Variety Score (count of crop species)	
Low (3-8 crop species)	86 (47.78)
Medium (9-15 crop species)	68 (37.78)
High (16-22 crop species)	26 (14.44)

3.2.10 Milk production per day

Majority of the respondents (52.22%) had milk production up to 15 litres per day. Nearly 42.78% of the total respondents had 16-30 litres of milk production per day followed by only 5 percent having milk production of more than 30 litres per day (Table 5).

3.2.11 Milk marketing channels

Dairy co-operatives and other channels like vendors and private hotels were the major milk marketing channels in the study area (Table 5). Vendors and private hotels (31.11 %) were an equally important marketing channel as dairy co-operatives (30.56%) in Tamil Nadu, followed by household (22.78 %) and both households and co-operatives (15.56%).

3.2.12 Monthly PDS access

Most of the respondents (91.67 %) had regular monthly PDS access. Only few respondents (8.33 %) did not have monthly PDS access (Table 6). The inaccessibility was either because some did not prefer to go to PDS access as they had enough food access and sometimes it was because of the problems with the PDS shop not having enough stock irregularity of the PDS shop keeper in distribution of the stock etc. The results are consistent with the findings of Ghabru, Devi and Rathod, [30].

Table 5. Herd size, daily milk production and milk marketing channel of the respondents

Socio-demographic variables	Frequency (%)
Herd size	
Low (2-4 animals)	122 (67.78)
Medium (5-7 animals)	50 (27.78)
High (8-10 animals)	8 (4.44)
Milk production/ day	
Up to 15 lit/ day	94(52.22)
16-30 lit/ day	77 (42.78)
Above 30 lit/ day	9 (5.00)
Milk marketing channels	
Dairy co-operatives	55 (30.56)
Households	41 (22.78)
Co-operatives +Households	28 (15.56)
Others (Vendors, hotels)	56 (31.11)

3.2.13 Monthly food expenditure

In the study area around Rs. 1800-6500 was spend on food alone per month by the respondents' households (Table 6). More than half of the households (57.22 %) had an expenditure of Rs. 1800-3200 per month on food items followed by 32.22 percent of them spending Rs. 3201 to 4600 and 10.56 percent spending up to Rs. 6500. The monthly food expenditure thus was generally low for majority of the respondents.

Table 6. Monthly PDS access and monthly food expenditure

Socio-demographic variables	Frequency (%)
Monthly PDS Access	
Yes	165 (91.67)
No	15 (8.33)
Monthly Food expenditure (Rs.)	
1800-3200	103 (57.22)
3201-4600	58 (32.22)
4601-6500	19 (10.56)

3.2.14 Drinking water access

Drinking water access is considered as an important component that affects nutritional status. Most of the respondents (62.20 %) had tap water facility at home. But few respondents depended on purchasing of water (23.33 %) as well as community water source (14.44 %) for drinking water (Table 7).

3.2.15 Beneficiary of nutrition/health schemes

A greater majority of the total respondents (80.56 %) were not beneficiaries of any nutrition or health schemes and only 19.44 percent of the farm women had got any benefits from nutrition or health schemes in the form vitamin supplements, seeds for home gardens etc (Table 7).

3.2.16 Social participation

Major social participation were in dairy co-operatives by most of the respondents (58.89 %) followed by self-help groups (31.11 %) and farmer groups (18.89 %). Studies [31] show that farmer groups are a particularly effective platform to improve crop yields and other constraints confronting female farmers (Table 7).

Table 7. Drinking water access, beneficiary of nutrition schemes, social participation, distance to nearest market, contact with ASHA Workers and BMI

Socio-demographic variables	Frequency (%)
Drinking Water Access	
Pipe facility in home	112(62.2)
Purchased	42 (23.33)
Community water source	26 (14.44)
Beneficiary of nutrition/health schemes	
Yes	35 (19.44)
No	145(80.56)
Social participation	
Dairy Co-operatives	106 (58.89)
Self-Help Groups	56 (31.11)
Farmer groups	34 (18.89)
Distance to nearest market (Km)	
Up to 2.5 km	50 (27.78)
Above2.6 to 5 km	88 (48.89)
Above 5 km	42 (23.33)
Contact with ASHA workers	
Once or more in a month	5 (2.78)
Once or more in 6 months	40 (22.22)
Rarely	135(75.00)

3.2.17 Distance to nearest market

The proximity of market is proven to have both positive and negative influence on nutritional status. Nearly half of the respondents (48.89 %) had market in a distance of 2.6 to 5km followed by 27.78 percent had markets in 2.5 km distance and 23.33 percent having market at a distance of more than 5km (Table 7).

3.2.18 Contact with ASHA workers

Accredited Social Health Activist are responsible for creating awareness on health and its social determinants, distribute supplements and mobilise the community. A greater majority of the respondents (75.00 %) were contacted rarely by the ASHA workers, followed by once in 6 months (22.22 %) and once or more in a month (2.78 %) (Table 7).

4. CONCLUSION

Farm women being the major workforce in agriculture sector are yet to be given the attention they deserve in the nutritional front. Farm women in aspirational districts are all the more vulnerable to malnutrition and needs more focused attention. As the BMI measure indicates, not only 8undereight, but overweight and obesity is also a rising problem among farm women. Though these farm women are the cultivators, their dietary diversity is very low as implied by the low MDD-W scores. To eradicate malnutrition, access to diverse diets rather than just staples is important. For ensuring consumption of diverse healthy diets effective behavioural change communication need to be given to farm women. In total the study calls for nutrition sensitive interventions in aspirational districts with emphasis on gender.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

MDD-W is a dichotomous indicator of whether or not women 15 to 49 years of age have consumed at least five out of ten defined food groups the previous day or night. It is a food group diversity indicator that reflects one key dimension of diet quality – micronutrient adequacy – summarized across 11 micronutrients: vitamin A, thiamine, riboflavin, niacin, vitamin B-6, folate, vitamin B-12, vitamin C, calcium, iron and zinc. 2 The proportion of women of reproductive age (WRA) 3 who achieve this minimum of five food groups out of ten in a population can be used as a proxy indicator for higher micronutrient adequacy. In other words, a higher prevalence of MDD-W among a group of WRA is a proxy for better micronutrient adequacy in a given population [25].

The ten food groups:

1. Grains, white roots and tubers, and plantains
2. Pulses (beans, peas and lentils)
3. Nuts and seeds
4. Milk and milk products
5. Meat, poultry and fish
6. Eggs
7. Dark green leafy vegetables
8. Other vitamin A-rich fruits and vegetables
9. Other vegetables
10. Other fruits

Source: FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. (2021). *MINIMUM DIETARY DIVERSITY FOR WOMEN: An Updated Guide to Measurement-from Collection to Action*. FOOD & AGRICULTURE ORG.

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