

FEMINISATION OF AGRICULTURE AND FOOD SECURITY

FIZZA SUHEL

Ramjas College, University of Delhi

Abstract

The paper aims to analyse the determinants of feminisation of agriculture with emphasis on food security. It studies the effect of cereal consumption, migration, rural literacy, rural poverty, female wages and gender wage differential on the number of female agricultural workers. The paper checks the theory of work capacity curve which states that work productivity is positively related to one's nutritional level by using cereal consumption as an indicator of nutrition. It further explores the role of women in major aspects of food security and the barriers which arise due to gendered division of labour and assets. Women have been denied land rights and control which adversely affects food production. They contribute more than their male counterparts in the domestic sphere and almost equally in the fields, yet do not get recognition as farmers. The nutritional context of women is also studied in the paper, identifying their disadvantage as compared to men in nutrition and food security. By highlighting women's role in major aspects of food security and the determinants of their participation in the labour force, especially in agriculture, this paper captures the feminisation of agriculture and food security.

1. INTRODUCTION

In recent years South Asian countries have seen an increasing presence of women in the male-dominated field of agriculture. For instance, in countries like Bangladesh, Bhutan, India, Pakistan and Nepal, 60-90 per cent women are employed in agriculture, showing higher participation than their male counterparts (FAO, 2005). Women have been at the core of food security in households for a very long time through their contribution in all three aspects of food security- production, accessibility and utilisation. However, it is no surprise that this results from a gendered division of labour which puts the burden of care-taking on the woman, often by glorifying this social obligation. In spite of a traditional perspective of their lower social status, if a male-dominated field observes a rise in female labour force, it becomes an important question to study. This paper looks at the factors which influence participation of women in agriculture with special emphasis on food security of households.

Women face inequality not just in the social sphere but at the household level too. Although they are the providers

of food, they often eat the least and after the male members have eaten. Consumption data in National Family Health Survey- II (NFHS-II) shows that 55 per cent of adult women in India consume milk or curd at least once a week, 33 per cent eat a fruit at least once a week and only 28 per cent eat an egg. In terms of health, 52 per cent of all adult women are anaemic and 36 per cent have a body mass index of less than 18.5 which is associated with chronic energy deficiency (Dreze, 2012). To understand how nutrition and food security affect female labour force participation, this paper studies the theory of work capacity curve. The theory draws a positive relationship between nutrition and work productivity which implies that one is able to supply his/her labour after receiving a certain level of nutrition required by the body to work.

Apart from food security, there are other factors which are capable of influencing the participation of women. Women's work increases due to migration undertaken by the male members of the family. Their work remains invisible in households. Places with high level of male migration see more women coming out and working as cul-

tivators. Rural male migration for employment purpose was 33 per cent as compared to 3.6 per cent for rural females (Swarna S. Vepa, 2005). This limits possibilities for women who are now left with local work. Marginalisation of agriculture has resulted from doubling of the workforce from 97 million to 185 million between 1950 to 1991 (Rao and Hanumappa, 1991). All high paying agricultural and non-agricultural jobs are taken up by males, leaving low paid work for women. With the exception of Tamil Nadu, states which offer lesser wages employ more women. Similarly, states with high wage differential between men and women observe more number of female workers. Thus, wage becomes an important factor for understanding female participation in work outside the household. The paper further explores role of education in increasing the participation of women. The relationship between low literacy and higher female participation in agriculture, as observed in countries like Papua New Guinea and the Solomon Islands, is concerning as low literacy hinders women's access to technology and the power to take decisions (FAO, 2005). In such a case, their increasing number is reflective of their existence as wage labourers and not as heads or leaders. Their nature of work in household production revolves around traditional gender roles based on cultural and religious perspectives. Rural poverty is a factor which acts as a push for women to work outside the household despite the social constraints and the paper delves deeper into this narrative.

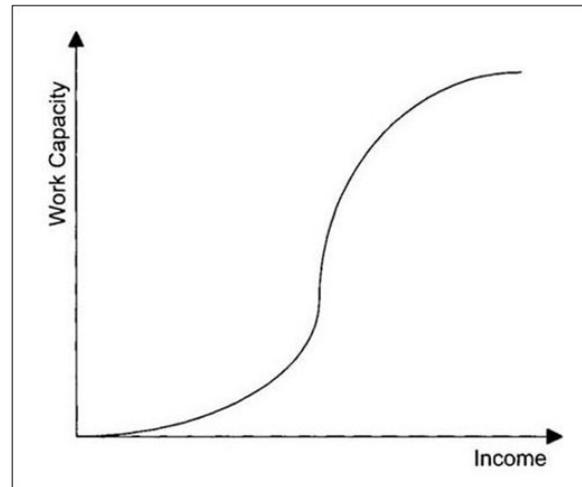
This paper explores the determinants of female labour force participation in agriculture using a multiple regression model. It discusses the issues faced by women in the context of food security and their role in the three main aspects- production, accessibility and utilisation. The next section presents a literature review of the studies which have been referred to in producing this research. After the literature review, the dataset used is described in detail followed by the methodology used in deriving results. A multiple regression model is used to determine the effects of several attributes discussed previously on the dependent variable- the number of female agricultural workers. The next section discusses the regression results from the model. An extensive discussion on food security and women follows which talks about their role in the major aspects of food security. One must understand that agriculture and food security do not exist in isolation and a study on women and food security will necessarily relate to agriculture.

2. LITERATURE REVIEW

An important study positively relating nutrition and labour force is Debraj Ray's work capacity curve (2009).

This curve shows that, at initial stages of nutrition, the body uses the energy to maintain resting metabolism. As more and more is consumed, it goes into productive work and productivity increases. When the nutrition level for resting metabolism is achieved, productivity increases with an increasing rate after which there is a phase of diminishing return because of natural limits. Ray used income as an indicator of nutrition due to the relation between high income leading to high consumption and nutrition. This paper studies this relationship between nutrition and work for female agricultural workers by using cereal consumption instead of individual income.¹

Figure 1: Relationship between nutrition and work capacity.



Source: *Development Economics*, Debraj Ray

Swarna S. Vepa's work on "Feminization of Agriculture" gives a broad picture of women's stake in agriculture. The contribution of women has been increasing and if the work in livestock, poultry and fisheries, water conservation, forestry and work related to common property resources is included, it exceeds that of men. Their access to credit, technology and resources like land, livestock and machinery is limited. Burden on women is increasing and low wages add to their deplorable condition, making female headed households the lowest income class. She reports how female main workers are replacing male main workers in rural sector by pointing out that the percentage increase in women workers has been 7.2 per cent as compared to 3.2 per cent for men workers. Women put in 23.6 hours a week in agriculture and get paid for only 60 per cent of their work. This reflects marginalisation of women workers with high levels of unpaid work in Haryana and Meghalaya where participation was higher in non-crop agricultural activities. She makes a distinction between marginal and main workers, elaborating how the former grew due to a lower pace of work opportunities as compared to the demand. Women have a disadvantage here as well and almost equal proportion in both catego-

¹Cereal consumption is used due to lack of data on other indicators like height and weight.

ries (46% marginal and 54% main). Her study emphasises on state level analysis highlighting Tamil Nadu, Rajasthan, Maharashtra, Madhya Pradesh, Andhra Pradesh and Gujarat for having more than 50% of agricultural labourers as women. Backward districts employ higher per cent of women as seen in Andhra Pradesh's Warangal, Nalagonda, Mahaboobnagar and Vizianagram which are less prosperous. This is due to two reasons. First, mechanisation has replaced women's labour and second, possible shift from rice cultivation to other crops has reduced labour requirements. Shortage of rice in states and increase in its price has led to lower calorie consumption. To study wage inequality, Vepa explores the proportion of female wages to male wages. Kerala, where absolute female wages are high, also has high inequality. Punjab, with low inequality, has just 13 per cent of female cultivators. These results highlight the importance of studying wage differentials and how it affects the labour force. Her paper discusses policy objectives of increasing wages, skills, incentives and access to resources for women who should be considered as regular workers and not those who occupy spaces left by men. Community participation and awareness creating activities burden them even more without bringing any economic benefit. Employment Guarantee Schemes could focus on employment opportunities specifically for women. They can be employed in environment restoration activities and focus should be to provide land and resource ownership.

The paper also draws reference from the neo classical theories of migration like those of Ravenstein's (1885) and Stouffer's (1940) which state that migration occurs due to differential in wages, economic conditions and opportunities. Intense stress arising from population growth, unemployment and inefficient agricultural practices push out a large workforce from agriculture to informal economy leading to urbanisation of rural poor. Social obligations and barriers lead to more migration of males than females for the purpose of employment. This migration forces women to work on household farmlands or secure position as agricultural labourers to meet household expenditure. Thus, migration turns out to be a critical factor for women to enter the labour force and the paper further explores this aspect.

3. RESEARCH OBJECTIVES

The paper studies the relationship between the number of female agriculture workers and cereal consumption, migration, female literacy, male literacy, average female wages, wage differential between males and females and rural poverty. It checks whether the theory of work capacity curve model holds true for the female labour force in agriculture by looking at their relationship with cereal consumption. The objective of the paper is to understand

the reason behind the increasing female participation in agriculture while highlighting their role in food security. In the knowledge of the author, enough empirical research on this question has not been pursued and this paper could help in setting the context. Apart from this empirical model, the research focuses on presenting existing literature on the role of women in food security and the problems faced by them in this field. Agriculture and food security are closely related as agriculture ensures enough food production. Therefore, a study of women in food security cannot be complete without looking at their contribution in agriculture.

4. DATA & METHODOLOGY

4.1. Data Source

The paper makes use of secondary data available from the Indian Human Development Survey (IHDS- II) database for the year 2011-12. It is a collaborative work by the National Council of Applied Economic Research, New Delhi (NCAER) and University of Maryland. The goal of this data collection was to observe changes in the daily life of Indian households in a transforming world. It nationally represented 42,152 households from all states except Andaman and Nicobar Island and Lakshadweep. Data from rural households was used and compiled to give district wide results for 274 rural districts. Parts 1 and 2, which pertained to individual and household data respectively, were used.

4.2. Data Description

Before moving to the regression model, it seems important to understand the following overview:

A considerable number of female agricultural workers can be observed through this data. As shown in Fig. 2, 41.24% of all districts show a higher number of female agricultural workers than males. Though numbers are high, women still lack decision making powers and ownership of resources. The percentage of women who can

Figure 2: Districts with higher female participation

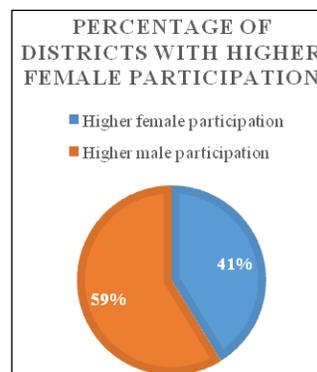
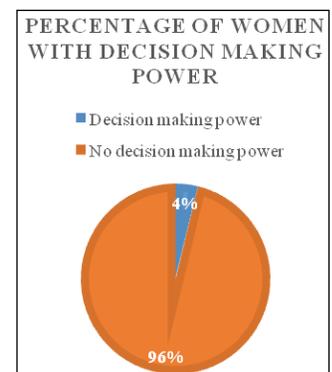


Figure 3: Women and decision making power



Source: Author's compilation

take decisions on farmland owned by their households remains extremely low as seen in Fig. 3.

Rajasthan has the highest ratio of female to male agriculture workers followed by Chhattisgarh and Madhya Pradesh. These states perform fairly low in terms of average wages proving how women are concentrated in areas which are not preferred by their male counterparts when it comes to earnings. Table 1 gives the ranks of the top states with respect to the ratio of female to male workers and their ranks with respect to female wages.

Table 1: Ranks of States

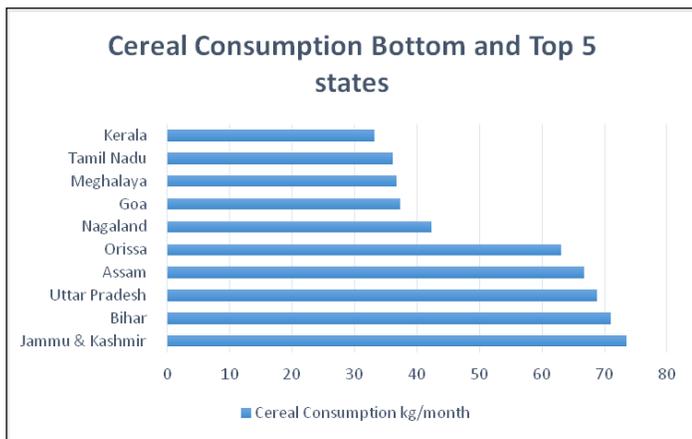
State	Rank in Ratio of Female to Male workers	Rank in female wages
Rajasthan	1	4
Chhattisgarh	2	25
Madhya Pradesh	3	21
Bihar	4	23
Andhra Pradesh	5	16
Uttar Pradesh	6	13

Source: Author's compilation

Chhattisgarh, Madhya Pradesh and Bihar belong in the top six for the ratio of female to male workers. However, they belong to the bottom 10 when it comes to agricultural wages.

Jammu and Kashmir, Bihar and Uttar Pradesh observe the highest average consumption of cereal while Kerala observes the lowest.

Figure 4: Consumption- Top and Bottom 5 states



Source: Author's compilation

4.3. Econometric Model

Econometric analysis is done using a Multiple OLS Re-

gression. Cross sectional data for 274 districts has been taken. The effect of cereal consumption, migration, wages of female workers, wage differential between males and females, rural poverty, literacy of females and males on the number of female agriculture workers is estimated.

$$FemAg_i = \beta_0 + \beta_1 Cereal_i + \beta_2 Mig_i + \beta_3 Wagefem_i + \beta_4 Wagediff_i + \beta_5 Pov_i + \beta_6 Litfem_i + \beta_7 Litmale_i + u_i \quad (1)$$

A brief discussion of the various attributes is given below

Table 2: Description of attributes

Attribute	Variable	Description
Female Agriculture Workers	FemAg	It measures the number of rural females in each district who work in the field of agriculture as an economic activity. It does not include those women who work in household farms as cultivators because data for their individual wages cannot be measured separately.
Cereal Consumption	Cereal	Average cereal consumption of rural households in each district is taken into consideration. Consumption of cereal like rice, wheat and other cereals were taken.
Rural Migration	Mig	Measures total migration in each district from all rural households
Wage of Female Workers	Wagefem	Average wage given to rural female agriculture workers in district i.
Wage Differential	Wagediff	Differential of average wage of male agriculture workers and average wage of female agriculture workers in district i.
Poverty	Pov	Rural Poverty is measured as the number of rural household below poverty line.
Female Literacy	Litfem	Total number of literate rural females in district i
Male Literacy	Litmale	Total number of literate rural males in district i

Source: Author's compilation

5. RESULTS AND DISCUSSION

5.1. Regression Results

Table 3: Regression results

	Coefficient	Robust Std Error	t-statistic
Intercept	40.29782	6.084594	6.62
Cereal	-0.71665***	0.1046331	-6.85
Mig	0.904256***	0.2387852	3.79
Wagefem	-0.00382*	0.0024971	-1.53
Wagediff	-0.00103**	0.000455	-2.27
Pov	0.114785	0.1646211	0.70
Litfem	-0.19983***	0.0789254	-2.53
Litmale	0.250257***	0.0814637	3.07
R ²	0.285141		
Adjusted R ²	0.266329		
Observation	274		

Source: Author's calculations

Notes: Hypothesis testing done using t-test.

Heteroscedasticity was observed using Breusch Pagan Test.

Robust standard errors have been used to deal with heteroscedasticity.

****significant at 99 % level*

***significant at 95% level*

**significant at 90% level*

5.2. Interpretation

Using one tailed t-values to check significance (for hypothesis testing), Cereal, Migration, Male Literacy and Female Literacy is significant at 99% significance level. Wage differential is significant at 95% significance level and Female wages at 90% significance level. Poverty is not significant. The result for cereal consumption contradicts the theory of work capacity curve. The negative sign of the coefficient would mean that, with an increase in cereal consumption, the number of women working in agriculture falls. Two propositions can be noted. First, the relationship between nutrition and work capacity does not hold. At low levels of nutrition, there are more women going out of the house to work. This relates to the issue of affordability of food. At low levels of cereal consumption, to be able to afford food becomes more important than maintaining enough nutrition for work. Although contradictory, this result is not surprising at all because the general perception around the employment of rural

women is not for achieving an economic position for the woman but to push it towards employment to fulfil the needs of the household, which, in this case, is food security through cereals. Secondly, it is probable that cereal consumption does not capture nutrition entirely. An individualistic approach can be a better fit to measure women's nutrition as inequalities within household members do exist which make women the most vulnerable to undernutrition.

When cereal consumption decreases by one kilogramme, the mean number of women increases by 0.717.

Migration gives expected sign of the coefficients. With every person migrating from the district, 0.9 women join agriculture. Wage differential between females and males is significant at 95% significance level. It can be interpreted as an excess of wages of males over that of females. There seems to be a negative relationship between wage differential and the number of female workers. As the gap widens, lesser women participate. Similarly, the sign of coefficient of female wages is negative. Districts with low female wages have more female agriculture workers as seen in Table 1.

Interesting results were observed for poverty as it turned out to be insignificant, contradictory to existing literature which states that poor economic conditions force women to join the labour force.

Female literacy is significant and the coefficient takes a negative sign. An increase in the number of literate women in the district leads to a decrease in the number of women in agriculture. Male literacy has a positive relationship with female participation which shows two things. First, literate men could be more capable of migrating and their migration forces women to work. Second, literate males could be more aware and support women's employment despite social barriers.

R² is a measure of goodness of fit of the model. A value of 0.285 shows that the model is able to explain 28.5 per cent of changes in the dependent variable. Its value increases as more and more regressors are added which develops the need for adjusted R², a better indicator for comparative purpose. By looking at the adjusted R², the model explains 26.6 per cent of changes in the regressor.

To conclude this section, the work capacity curve theory does not hold true for women in agriculture and cereal consumption. It could be possible that cereals do not serve as a good indicator of nutrition in women and there is a need to look at more individualistic indicators. However, measurement of such individual consumption patterns becomes difficult. Migration serves as a highly criti-

cal variable along with literacy of males and females and the wage differential. It was surprising to observe that poverty was insignificant to the model.

6. WOMEN AND FOOD SECURITY

Chaudhary and Parthasarathy (2007) describe food security as “a state where all individuals have stable access to minimum amounts of food required for a healthy and active life.” Household food security is explained as a function of time and market commodities producing tangible and intangible (nutrition, warmth and health) commodities entering the utility function while individual food security depends on visible and invisible intra household factors like age and gender. Household food security does not ensure individual food security primarily due to gender inequality which puts women in a lower position in nutritional status and food distribution. This disadvantage faced by women is because of a weak bargaining power depending on their fallback conditions (Aggarwal, 1997). This position is a result of women’s unpaid work which is often looked down upon and can be hard to measure in monetary terms. Even in cases of paid work, their contribution is considered “insubstantial”. Scholars have tried to measure their work by looking at time contributions. This section explores the issues which arise for women in ensuring food security and their position in the various aspects of food security.

6.1. Issues

6.1.1. Lack Of Ownership Of Assets

Kelkar (2011) in his paper “Gender and Productive Assets” explores the gender divide in ownership of assets with emphasis on land. He explains how lack of asset control affects economic inequality, individual life, wages and decision making rights. He links this lack of control negatively to development and female empowerment. Rural women, who are mostly landless, are disadvantaged for they cannot be eligible for institutional credit structures as seen from only the 5 per cent of women who own a Kisan Credit Card. A high number of women work with livestock (93 per cent of employment) but they are absent from dairy cooperatives which are controlled by men. Female agricultural workers and female headed households are the most deprived stakeholders in agriculture because they not only lack land rights but also access to public service and technology. For instance, projects promoting commercialisation of vegetable production often train men. A knowledge barrier is a result of the perception of gender roles and disregard of women’s economic activity. Giving women control over assets leads to increased productivity. In Andhra Pradesh, when women-run dairy units were monitored, milk yield increased from 380 to

610 litres per dairy and profit from 3 lacs to more than 5 lacs per year. Similarly, findings from Integrated Rural Development Program and Tamil Nadu Women’s Development Program reveal that decision making influence of women increases when credit transfers are made directly to them. Even in situations where women have access, they continue to face social barriers in exercising control. A study by Chen et al (1989) explained how households with boys used larger proportion of inputs like fertilisers and irrigation. This shows that male presence in households ensures access to resources and thus provides greater incentive to investment.

6.1.2. Female Unpaid Work

Women are generally not as represented as men in economic activities due to their added responsibility of house work. They are responsible for child care as well as livestock rearing which serves as a constraint to the time and their capacity to engage in work. FAO reports show that women devote 85-90 per cent of time spent on household food preparation across countries. Despite such a role, women dedicate an increasing amount of their time in farm activities like land preparation, cultivation, threshing and drying etc. A study by Chaudhary et al (2007) tries to quantify women’s unpaid work in two villages (Ashta and Umra) of Maharashtra. Work is divided on the basis of gender roles and perception in both villages where repetitive and monotonous tasks are the responsibility of women and mechanically advanced tasks are carried out by men. There is a clear distinction of household as a female’s domain and workplace as male’s domain. Results from the village of Ashta are presented below:

Table 4: Time devoted to farm work and domestic activities by men and women

Household Category	Number of hours devoted to farm work per day		Number of hours devoted to domestic activities per day	
	Male	Female	Male	Female
Large MHH	1.75	1.7	1.1	5.05
Medium MHH	1.62	1.8	1.93	5.3
Small MHH	0.74	0.71	2.17	7.6
FHH	0	0.065	0	6
All	1.02	0.91	1.25	6.37

MHH- Male Headed Households

FHH- Female Headed Households

Source: Chaudhary and Parthasarathy (2007)

Table 4 shows that across all sizes of households, women’s contribution to farm work is almost equal to men’s and way more in case of domestic activities. In total, women spend six times more hours in household work than men and men spend only 1.12 times more

Table 5: Monetary value of domestic work and food security

Household category	Monetary Value of Per Day Domestic Work Done by Men and Women in the Household			Per day male and female contribution in rupees to household food security.		
	Male	Female with male wage rate	Female with female wage rate	Male	Female with male wage rate	Female with female wage rate
Large MHH	33	160.6	101	85.5	202.5	35
Medium MHH	57.9	204.9	106	113.2	196.7	132
Small MHH	65.1	203.7	152	106.2	258.06	175
FHH	0	180	120	9.8	196.7	136
All	37.5	192.4	127.4	81.5	221.4	150.4

Source: Chaudhary and Parthasarathy (2007)

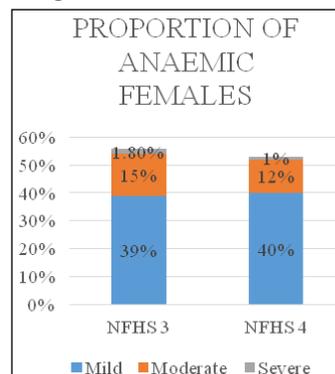
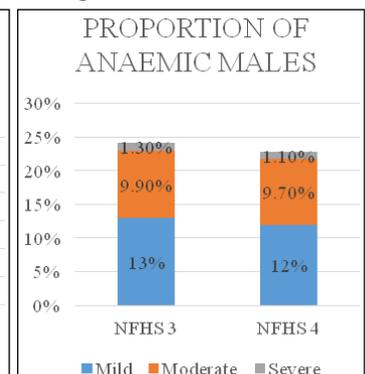
hours in farm work than women. Quantifying this contribution in monetary terms gives a clearer picture of women's contribution.

When women's domestic work is quantified, it is more than men's contribution with both male wage rates and female wage rates. Women's support to food security is more than that of their male counterparts. Assessing at female wage rates, women remain responsible for 70 per cent of their families' food requirement.

6.1.3. Nutritional Status

India Health report 2015 confirms that 55 per cent of women between 15-49 years of age are anaemic with state numbers as high as 76.3 per cent as in West Bengal. Children born of malnourished mothers are underweight and face 20 per cent higher mortality (UNICEF). An important health indicator for women is body mass index (BMI). A BMI of less than 18.5 is associated with chronic energy deficiency and higher than 30 is associated with obesity. All India proportion of thin women (BMI less than 18.5) is 23 per cent in the NFHS-4 with an urban rural variation. The proportion of thin women is 27 per cent in rural areas as compared to 16 per cent in urban areas. In NFHS-4, 53 per cent of women and 23 per cent of men are observed as anaemic without any change in trend over the last 10 years. Prevalence of anaemia in adults is negatively related to their schooling and household wealth. Figures 5 and 6 show the proportion of anaemic adults (both men and women) over the past 2 surveys. NFHS also reports data on consumption of food for both women and men. Women mostly consume green leafy vegetables but their consumption of non-vegetable, non-cereal diet is concerning. Only 45 per cent consume milk or curd daily, 23 per cent consume once a week, 25

per cent consume occasionally and 7 per cent do not consume at all. Similarly, 54 per cent do not consume fruits at all. This shows lack of diversification in the diet of females.

Figure 5: Anaemic Females**Figure 6: Anaemic Males**

Source: NFHS 4

6.2. Role Of Women In Food Security

6.2.1 Food Production

Women have always been producers of food. They have involved themselves in household work of food preparation, collection of firewood and water and caregiving along with farm related activities. Despite such contributions, there is a lack of recognition of women as farmers. The Women Farmers' Entitlements Bill, 2011 aimed at providing recognition by issuing 'Women Farmer Certificate'. Census 2011 defines cultivator as someone who operates on a piece of land. Since a large number of women do not own land, they fall under the ambit of cultivators and not farmers, affecting their access to government schemes and Kisan Credit Cards. Swaminathan Reddy, who introduced the bill, explained "an identity card for women is useful for access to entitlements. The

Kisan Credit Card, for example, requires land ownership title.”

Women offer most of the labour for producing food crops and control the sale of food produced on their land but asymmetries in asset ownership negatively affect food production. Time use studies help in explaining how much time women put in agricultural activities. Kadiyala et al (2014) explain that women employed in agriculture are unable to improve nutritional condition for children due to lack of time. They are held responsible for both domestic and farm work. Even though women hold such intrinsic role in food production they can be easily displaced. As their work in agriculture becomes mechanised, men take over their position. Policy makers need to realise that women could be used as an instrument for better food production and more security by giving them the recognition they deserve.

6.2.2. Access

Nutritional status is not ensured through food production. Accessibility of food is the second step to ensuring food security and women play a major role here. Two studies are able to explain their importance in this context. Mehcar (1998) in an intrahouse study in Kerala talks about how women contribute more to household income (both in absolute and proportional terms) than men despite earning less because of low personal expenditure. Hoddinott and Haddad show that a \$10 increase in women's income has the same effect on child nutrition as \$110 increase in men's income, highlighting the importance of female income of wage rates. When it has been established that a large part of women's income goes into child nutrition and food security it becomes all the more essential to ensure equal if not high wages for women. Women earned 71 per cent of male wages in 2007-2008 with variation like 90 per cent in Gujarat and 54 per cent in Tamil Nadu (Rao, 2017). Studies show that rural women are confined to agricultural activities and earn half as much as males for the same nature of work. Even though they earn less, they work more than their male counterparts. A time use study shows that male contribution to house and farm work is declining in both rural and urban areas while women perform 53 per cent of the work. At times, higher income does not necessarily lead to better health status. This can be clearly seen at the macro level by comparing performance of countries. India has a per capita GNI of \$730 which is higher than most of the sub Saharan countries but its child stunting rates are as high as 46 per cent. Gambia, with a per capita GNI of \$290, has a 19 per cent child stunting rate. This shows that distribution or inclusive growth is required to ensure well-being. India has been able to ensure a certain level of social protection through its much celebrated Public Distribution System (PDS) under which poor households

receive cereals at a very low price. Dreze and Khera (2013) clearly point out the effect of an efficient system. In Chhattisgarh, one of the poorest states in the country, 73 per cent of rural households buy food from the PDS. Accounting for the PDS transfer, head count ratio dropped by 17 per cent and poverty gap index dropped by 39 per cent in Chhattisgarh. The National Food Security Act (NFSA) of 2013 has changed food security from a welfare approach to a rights approach and recognises women as head of households for food provision and management. Both NFSA and PDS are essential in changing the way food security is dealt within the country. Female specific interventions are still lacking and need a space in policy.

6.2.3. Food Utilisation

Women's role in this aspect can be much more important than the two aspects discussed above. Through gendered division of labour, women are also responsible for preparation of food and thus the burden of diversification of food consumption falls on them. Cereal consumption does not fulfil the requirement of micronutrients like Vitamin A, Vitamin C, Iron, Zinc and Iodine. Lack of proper diet not only affects individual health but can also have economic repercussions. In Sierra Leone, Iron deficiency in agricultural workers can cause a loss of \$100 million in the economy in 5 years (World Bank). Food utilisation is set in the context of nutrition and health and women are at the centre of this issue as they work for household and child nutrition. India has been one of the worst performers in child nutrition indicators. Nearly half of the children are underweight and stunted and 16 per cent are wasted. Although mothers play a crucial role in securing better health for children, it was observed that only 55 per cent of children less than 4 months of age are breastfed (Arnold et al, 2004). Since women spend long hours in the field in unpaid and wage labour, they cannot give enough time for child care. This holds true for Schedule Caste (SC) women as 67 per cent of SC children below 5 years of age are underweight (Rao et al, 2017). In the case of women belonging to the Schedule Tribes (ST), a significant share of their time goes into forest related activities like collecting and selling forest products and gathering mushrooms and bamboo shoots for household consumption. This affects the health of their children which is similar to the SC children, though wasting levels are higher. When women do not engage in agriculture or wage work, the time they devote to childcare increases. This result can hold true for all employed women but the need to stress on women in agriculture arises because of their unrecognised status. Rural women spend more income as well as more time towards food security and initiatives promoting equal burden of work and efficient usage of resources for diversification of food consumption are required.

7. SCOPE FOR FURTHER STUDY

The paper tries to measure nutrition through household cereal consumption due to lack of data. Further research can be done by taking different indicators of nutrition like non-cereal consumption, Body Mass Index etc. to check the relationship between nutrition and work productivity. Public Distribution System has become a major initiative for ensuring food security. However, it cannot be efficient in the presence of leakages. Studies on understanding these leakages due to corruption can help in realising its actual benefit. There is a requirement to obtain individual consumption patterns for women. Household food security is not the same as individual food security. Women have been the disadvantaged sex in this sphere and there is a need to have studies specifically mapping their individual food security.

8. CONCLUSION

The discussion on women and their contribution has been able to establish the position they hold in agriculture and food security. They contribute to both domestic as well as work spaces but it is considered as a social obligation instead of an economic activity. Issues of women are mostly taken up by social groups and do not get enough space in policy. Based on the discussions in this paper few needs of women for improved agriculture and food security can be identified. Policies and programmes need to recognise women as equal contributors and have women specific interventions. Awareness about technology should be kept in mind for women who do not have access to it and proper training should be ensured. Women

should be given land rights and the support to pursue agriculture enterprises irrespective of their land rights. Emphasis should be on infrastructure to reduce the burden of longer hours and unpaid work. Young girls travel long distances to collect water and firewood for households. Village panchayats can take the responsibility for providing such facilities and give a platform for women to share their opinion. Educating women about their rights in employment and ensuring equal wages for both sexes should be a priority for the welfare of female headed households.

Quantification of women's work in food security, as mentioned in the previous sections, gives a clear picture of a higher contribution by women than men. Such studies should be promoted to highlight the areas where men can put more effort and work in coordination with women. The paper has been able to explain how women take up a huge space in the area of agriculture and food security. It has highlighted the barriers to their development which are necessary for framing any policy. It started with the discussion on factors affecting the female labour force participation in agriculture. Migration, gender wage differential, female wages and literacy of males and females were proved to be critical factors. It was interesting to observe that poverty had no effect on their participation. The theory of work capacity curve relating nutrition and work did not hold true in this analysis which highlights the importance of nutrition indicators observing individualistic behaviour. Apart from the empirical model, the paper described the food security situation and women's position in this sphere by looking at the existing studies in this area.

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