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"STRENGTHENING WOMEN FARMER'S ROLE IN STRATEGIC FARM DECISION MAKING: PERSPECTIVES, CHALLENGES AND THE WAY FORWARD"

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ABSTRACT:
It is beyond doubt that women make important contributions to agricultural and rural economies across all regions of the world, despite differing viewpoints. To enable the rural women farmers to overcome or manage their farm management concerns, public policy support is being extended by the government, however much needs to be done as yet in this regard for the same. An effort has been made through this research to uncover the aspect of leveraging policy measures to enhance the participation of rural women in farm management and land operation practices. Post this, the influence of participation and productivity enhancement on the economic well-being of women is analyzed. A total of 2000 women farmers as per a scientifically designed sample plan were approached for interviews of which 1010 were completed. The present study has made an effort to describe the same from the perspective of participation in various activities, frequency of participation, classification as per the pre-harvest and post-harvest activities, the constraints encountered in the process, etc. It is found that 'type' of activity revealed that the majority of women were involved in Seeding followed by Land clearing, planting, and harvesting. The strategic aspect of "Marketing" is taken up by a very meagre number, thereby indicating that rural women still need inclusion in policy aspects and that of decision-making aspects to ensure that their role is elevated. The data on 'decision making' however revealed that women were indeed having a certain sense of liberty to take impactful decisions affecting their farm-related prospects.

Key-words: *Strategic farm management, Women Farmers, Land operation practices, Decision making, Pre and Post harvest activities & Policy support*

INTRODUCTION:

Women in India are the backbone of the society and important resource in agriculture and rural economy. They make essential contributions to the agricultural development and allied and household activities and pursue multiple livelihood strategies. Women in India are major producers of food in terms of value, volume and number of hours worked. In rural India, the percentage of women who depend on agriculture is as high as 70%. Women have largely been the unseen face of Agriculture in India. Their role in creating value in different walks of life needs no introduction and praise, however, when it comes to Agriculture, their role has largely been under-emphasized. Though a large percentage

of women and in particular the rural women have been involved in farming activities in the Asian countries, particularly India, much needs to be done as yet in areas of extending policy support to ensure that women have an equal say in strategic farm management and land operation activities such as marketing of agricultural produce, usage of farm income, investment decisions, plot selection, opinion leadership and the like.

The role of women in agriculture is generally determined by a combination of factors. These include the extent and nature of agricultural labor performed; the quantum of food produced, access to technology, decision-making ability, and access to institutions. There has also been an attitudinal change in rural women as far as their involvement in farming is concerned as their views to take up farming are influenced by factors such as perceived lesser scope in farming as a profession, domination of the man leading to lack of confidence, inheritance laws that have often garnered justice to women, lack of own lands, lack of irrigated lands and their internal barriers such as family responsibilities that place a workload on their ability to manage their strategic farm activities professionally to name a few.

Factors influencing participation of Women in Strategic farm and Land Operation Practices:

The agricultural sector in India has several dimensions of crisis including declining plot sizes, inflation in food prices, increasing costs of production relative to farm incomes, farmer suicides, and so on (Mishra 2006; Dev 2012; Eapen and Nair 2015; Pritchard *et al*, 2014). The deepening agrarian crisis has encouraged rural men to seek livelihood opportunities beyond agriculture and to migrate out of rural areas in search of work (Tumbe 2014; Agrawal and Chandrasekhar 2015). As women's roles in agriculture change – both in response to men's labor market activities and in pursuit of their aspirations – the very idea of who might be considered a 'farmer' or of what constitutes a 'farming livelihood' is being reframed. Changes to the gendered composition of agricultural work and decision-making are central to the dynamic of rural restructuring in contemporary India. The topic of the 'feminization of agriculture' can be inferred in two ways. As a first and more limited sense, the concept of feminization refers to an increase in the amount or proportion of farm-related work undertaken by women. As noted by Lahiri Dutt (2014), this encompasses women's increased responsibilities in smallholder production as well as their growing participation as wage workers in non-traditional agro-export production. In the second, and more expansive sense, the concept addresses the extent to which women define, control and enact the social processes of agriculture Addressing this latter interpretation takes into consideration labor (Tamang, Paudel and Shrestha 2014; Zuo 2004; Duvvury, 1989 and Chowdhry, 1993), ownership of farmland and other resources(Agarwal 2012), power to make decisions (Lastarria 2006).

A comprehensive review on the role of women in agriculture was published by the Food and Agriculture Organization (FAO) in 2011, on the exact contribution of women both in terms of magnitude and nature. Moreover, the share of women in the unorganized and unskilled labor force is more than men that reinforces and regenerates another form of discrimination in terms of access to opportunities for skill development. Rawal and Saha (2015) have observed as supporters of economic liberalization see women's increased labor force participation as evidence of empowerment in economic terms while critics relate an increase in participation of women to agrarian crises – in particular, those part of the non-profitable crop production and migration of distress (Kanchi 2010); Kelkar and Wang 2007; Srivastava (2011). The major issue related to women in agriculture is their limited access to productive resources, especially land. Limited inheritance rights defined by the patriarchal structures deprive women of ownership of land, control of assets, and decision-making powers. A combination of social and structural factors shapes women's empowerment (Bhagat and Das 2008; Sikiri 2005). Feminization of agriculture is a global phenomenon that is more so in western

Rajasthan. During times of distress, men migrate searching for livelihood options, and women are expected to take charge of households, cattle, and allied fields.

Mirtorabi *et al* (2012) conducted applied research using a survey method to analyze factors influencing rural women's participation in food processing activities in Asara Karaj, Iran. Both descriptive and inferential statistics were employed to analyze data. The results of this study indicated that rural women's participation in processing activities depended on variables such as the level of education, family size, animal ownership, internal and using extension, and education classes. Rahman (2008) conducted a study in Northern and Southern Kaduna State in Nigeria to examine the status of women involved in agriculture. Data were analyzed using descriptive statistics and the author employed a logit regression model to find out factors that satisfy women in agriculture. The main findings of this study were that the participation level of women farmers in farm decision-making was lower than that of men. The authors further explain that some women could not purchase needed agricultural inputs or adopt new technologies because they did not have the power to make decisions without their husband's consent. The uneducated and the poor were the ones mostly involved in agriculture but barely involved in farm decision-making.

Farid *et al* (2009) undertook a study in Bangladesh using quantitative methods to determine and describe the nature and the extent of rural women's participation in agricultural and non-agricultural activities. Their study found that poor rural women were the ones mostly involved in agricultural and non-agricultural activities. The results showed a negative correlation between the level of education and the rate of participation in agricultural activities. Unnati *et al* (2012) undertook a study to establish the extent of women's participation in farm decision-making in Renapur and Ausa Tahsils of Latur district, India. Utilizing a multiple regression analysis, the study revealed that age, education, and annual income were positively and significantly correlated to the participation of women in farm decision-making. Similar findings were also reported by Lad *et al* (2012) and Bhat *et al* (2012) who also conducted studies in India. Sarita Singh & Sangeeta Kushwah (2015) in their study on factors affecting participation of rural women in agricultural activities sought to explore the relationship between the extent of women participation in agriculture and their selected traits and the factors behind the same. The study was conducted in the Hohsangabad district of Madhya Pradesh during 2010 – 11 spanning a sample size of 144 using a structured questionnaire that identified sixteen traits namely education, farming experience, scientific orientation, economic status, mass media exposure, aspiration level, source of information, etc. These were found to have a strong correlation with the level of involvement and occupation of rural women. The independent variables namely caste, annual income, land holdings, and extension contract was found to have a positive but less significant relationship while its relationship with the marital status was not high enough to be statistically significant.

Rafeal & Aramayis et al (2012) explore the possibility of building a logit model to evaluate the influence of household socio-economic characteristics on the likelihood of rural women participating in agricultural labor in Armenia. Though it seems to account that almost 43% of the agricultural labor force in the world comprises women, yet there appears to be a lack of data in relation to strategic areas in farm decision making the women are being considered. Binomial logit analysis was conducted in this study to assess the likelihood of women's labor force participation through the independent variables namely the socio-economic ones. The age of women was hypothesized to positively impact the probability of rural women participating in agricultural labor. However, the presence of social traditions and norms had a negative relationship. Kavita Baliyan (2012) sought to examine the role and participation of women in vital farm-related decision-making areas and examine the socio-economic factors that determine female participation therein. In a study encompassing a multi-stage sample

design across 120 farm households of Muzzafarnagar, which is considered to be the sugar basket of Uttar Pradesh, data was collected through a questionnaire – highlighted the following facets: Women's decision making power is relatively higher in the small farmers' household as compared to the large ones; less than one-third of women in the study opined that they were given due importance in areas such as purchase & sale of animals, land, farm output, type of seed sowing and use of fertilizers. The factors that caused the above were identified to be the size of family and land holdings, role in other works, age, level of education, etc.

Prabhu L Pingali (2017) sought to study the relationship between the Women's Empowerment in Agricultural Index (WEAI) and the market orientation of farm production in India. The data was collected from 1920 adults in the Chandrapur district of Maharashtra. The research also had the aim of assessing the association between women's participation in agriculture and their role in non – agricultural domains. The variables used for analysis were categorized into cash cropping, food cropping, and landless households. The sub-indicators were identified as usage of assets, control over the use of income, workload, speaking in public, decisions about credit, group membership, leisure, etc to name a few. It was found that women farmers take a backseat in areas of resource access and leadership. Julie A Silva (2014) in their study on multi-level analysis of agricultural trade and socio-economic inequality in Rural Mozambique stressed the focus on investigating the association between agricultural trade and inequality in rural regions with a special focus on women farmers. The data was refined through a national household survey comprising of 8289 units that were made simple through the adoption of a snowball sampling technique that spanned cross-sectional data. Data triangulation to verify the validity and reliability was made use of in the constructs identified for the study that laid a greater emphasis on factors such as social standing of women, community cohesion, access to services, agricultural marketing, off-farm income sources, climate, location, health, physical infrastructure, and other demographics. The results of this research effort suggested thus: inequality is more in those regions where women have low social status and vice versa for higher social status; the social and geographical contexts greatly influence the relationship between agricultural trade and inequality towards women in farm-related activities; corruption, civil conflict, and ethical strife also emerge to be key indicators of inequalities that women are often subjected to when it comes to their strategic engagement in farms. Sabina Alkire et al (2013) studied Women's empowerment in Agriculture index. The study measured empowerment in agriculture based on five domains of empowerment like production, income, resources, leadership, and time. The sample size for the data collection was 350 households in Guatemala and Uganda and 450 households in Bangladesh. The index is composed of two sub-indexes: One measures 5 domain empowerment and the other measures gender parity of empowerment within the household (GPI). The study found that gender parity is highest in Bangladesh and lowest in Guatemala. The a low correlation between education and Women's empowerment in Bangladesh because agriculture is conceived of as a Man's domain than a Woman, even if highly educated, may not participate in agricultural decisions.

Factors influencing Female Equality in Agricultural activities:

Sonia Akter (2017) analyzed Women's empowerment and Gender equality in Agriculture from Southeast Asia. The study contributed to the geographical scope of the literature by presenting empirical evidence from Southeast Asian countries like Myanmar, Thailand, Indonesia, and the Philippines by using the framework recommended by the Women's empowerment in agriculture index(WEAI). The study was conducted using 37 focus group discussions and 290 women farmers in the above-mentioned countries. The result revealed that there is a contradiction in the conventional description of gender inequality in agriculture in certain domains of empowerment. The study found that in all four countries Women appear to have equal access to productive resources, like land and

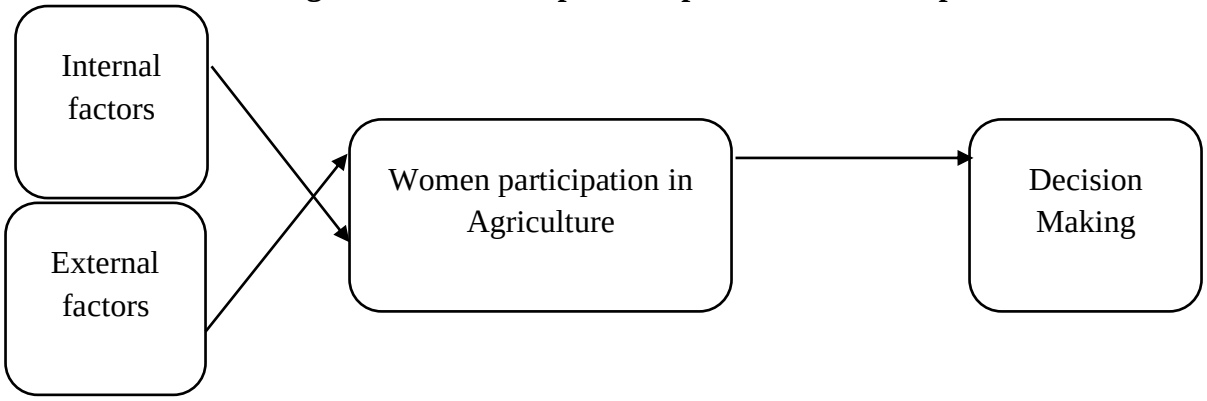
inputs, and more control over household income. While Women play an active role in agricultural groups in Thailand and the Philippines than Indonesia and Myanmar which is considered as men's territory. The conclusion of the study implies that country-specific gender intervention frameworks are important to overcome gender gaps in Agriculture.

Soumya Gupta (2019) emphasized adapting the Women's empowerment in Agriculture index to a specific country context in India. According to this study adoption of Women's empowerment in the Agriculture index (WEAI) multi-dimensional measure of Women's access to various resources pertaining to various domains of agriculture. The study highlighted that several challenges were faced in the adoption of questionnaires in local agricultural contexts. In this study, challenges in adopting WEAI across 3600 households in India were addressed. Women's empowerment in the agriculture index (WEAI) is an extremely useful index and gives the ability for researchers as a direct, domain-based measure; the need to contextualize the tools to specific contexts and programs is important. The study contributed to this discourse in detail. Based on their research experience of implementing the index across four locations in India, demonstrated how to adapt the WEAI to site-specific, well-defined indicators of women's role in agriculture.

Singh and Vinay (2012) briefed in their working paper about the significance of female labor in agriculture and allied activities. They further stated that the role of women in agriculture as female labor is not highlighted in India. Despite their presence in activities sowing, transplanting and post-harvest operations they are considered an invisible worker. Damisa et.al (2007) highlighted in their study that despite various social, economic, and various other constraints women have high-level participation in agriculture and they are very committed to their agricultural activity. Overall the level of involvement of women in farm decision-making was found very medium. The extent of involvement and decision making in activities like intercultural operations is 48 percent in the harvesting of crops 45.33 percent, storage of farm produce is 42.67 percent; 42.00 percent in the sale of farm produce, and subsidiary occupation like animal husbandry and dairy business is 38.67 percent and financial management is 36 percent only (Unati et.al, 2011). Bala (2010) cited in his working paper regarding engagement and participation of women workers in almost all activities of agriculture but there is discrimination in wages even if they do the same type of work as male labor. Further despite their extensive and active involvement in the agriculture of India, they are not considered for decision-making in farm activities. Women's participation in agriculture will be acknowledged when women farmers will actively participate to build and improve their knowledge and gain access to the new and necessary information to make use of most of them in their farming activities. By linking the knowledge and information flow amongst women socio-economic progress can be achieved (Dhaka et. al, 2012).

Equalizing access to productive resources assumes that given the same access to and control over agricultural inputs and technologies, on average female and male farmers would be equally productive. Under the common assumption that initial input applications have a higher return than subsequent applications (diminishing marginal returns), and that women start from lower levels, then marginal productivity gains from increasing women's use of inputs would be higher than investing in more of the same inputs for men (Croppenstedt, Goldstein, & Rosas, 2013; Quisumbing, 1996; Saito, Mekonnen, & Spurling, 1994; Udry, Hoddinott, Alderman, & Haddad, 1995; UN Women, 2015). Within this avenue, we consider two theorized pathways to economic benefits. Under the common assumption that women and men, on average, differentially prioritize resource expenditures, increasing a women's share of household decision-making authority would be expected to change household economic outcomes (Doss, 2013; Duflo, 2003; Pandey, Dev, & Jayachandran, 2016).

Women in farm Management and land operation practices: A Conceptual Framework:



The conceptual framework is an extension of the researcher's thoughts on the role and impact of rural women's role in strategic farming and land operation activities. The Internal and External factors that influence rural women to identify them in farm management practices have been justified initially with an exploration of variables that affect the same. This in turn decides the level of participation of women in strategic farming activities. This in turn then influences the performance of women in agricultural tasks that span pre and post-harvest activities. Ideally, the performance and productivity of women farmers thus would lead to their wellbeing which becomes the outcome variable that the researchers have conceptualized from the analysis.

Thus it is with this context that an effort has been made through this research to uncover the aspect of leveraging policy measures to enhance the participation of rural women in farm management and land operation practices. The present study is carried out with specific research objectives/questions: To investigate the factors influencing the extent of women participation in farm management practices in rural India; to explore the possible avenues to create a favorable ecosystem by policymakers in harnessing better engagement of women farmers; To provide relevant conclusions and recommendations to agricultural policymakers and other interested stakeholders on possible ways of improving women's participation in agriculture.

DATA & METHODS:

The description of the methodology adopted for that study consists of (i) sampling plan and (ii) questionnaire formulation and finalization of primary data collection.

(A) Sampling and sample size:

The survey was conducted using a multi-level stratified sampling: Multilevel sampling for selection of respondents - We first selected four states of South India and then sampled the districts. The districts were selected based on the per capita income, one advanced district and one backward district has been selected from each state. Within each district, two tehsil/block/taluks were selected using systematic random sampling. We then selected two villages from each taluk using a simple random technique after excluding villages that have less than 150 households as per the census of India 2011.

A total of 2000 randomly selected women farmers were approached for interviews of which 1010 were completed. Table 2.2 shows the spread of the achieved sample of this study.

Table: Overview of sample by level of stratification

STATE	ADVANCED DISTRICT	BACKWARD DISTRICT
KARNATAKA	DAKSHINA KANNADA MANGALORE: PUTHIGE 30; BELUVAI 33 SULYA: ALETHY 32; AJJAVARA 29	KALABURAGI CHINCHOLI: CHIMMANCHOD 34; CHANGTA 37 JEWARGI: ARALGUNDI 35; KOLKUR 32
TAMILNADU	MADHURAI THIRUPARANGUNDRAM: ERKUDI 33; NALLUR 29 T. KALLUPATTI: ARASAPATTI 34; KUNNATHUR 37	THENI UTHAMAPALAYAM: KEELAGUNDALUR 34; ROYAPPANPATTI 31 PERIYAKULAM: MELMANGALAM 32; THAMARAIKULAM 31
KERALA	THIRUVANANTHAPURAM NEDUMANGAD: ARUVIKKARA 37; ANAD 32 NEYYATTINKARA: CHENKAL 34; MARANALLOOR 28	MALAPPURAM PERINTHALMANNA: ALIPARAMBA 29; EDAPATTA 38 PONNAI: VELIYANKODE 33; VATTAMKULAN 37
ANDRA PRADESH	KRISHNA VIJAYAWADA: GUNDAVALLI 28; KOTTURU 23 PEDANA: CHENNURU 29; NANDAMURU 25	ANANTAPUR HINDUPUR: KIRIKERA 28; CHOWLUR 29 GUNTAKAL: NAGASAMUDRAM 30; NELAGONDA 29

The interview was conducted face to face at the place of residence of the respondent, using a standard structured questionnaire in their language spoken and understood by the respondent.

(B) Primary data collection through a semi-structured questionnaire:
Based on the literature survey and the interactions we had with the officials of (i) Department of agriculture in Karnataka and Tamil Nadu and, (ii) Mahila Kisan Adhikar Manch (MAKAAM) and academic experts from the Indian Institute of Science (IISc), Indian Institute of Management Bengaluru, we first designed a draft questionnaire. The draft questionnaire was canvassed among 50 women farmers of Karnataka (30 women farmers) and Tamil Nadu (20 farmers), in the second half of august and the first half of September 2020, who actively participated in agricultural activities. Based on the inputs received, we finalized our questionnaire.

The final questionnaire comprised of four sections: (i) Profile covering women farmers' demographic and socio-economic characteristics. (ii) Participation level of women farmers in agricultural activities and decision making. (iii) Attitudes of women farmers towards agriculture with respect to personal and supporting factors and (iv) Agricultural performance. The full-fledged field survey of primary data collection was started in September 2020. The fieldwork was completed in April 2021 using primary data collection from a total of 1010 women farmers of south India.

Of course, the present study has certain limitations: 1) it is confined to only four states of south India, in which people are involved in agriculture dependent on seasonal monsoons. The agricultural background and cultivation might be strikingly different from many of the other states in India. Therefore, the findings of the study may be less relevant in northern Indian states. 2) It is confined to only women farmers in rural areas of south India.

Analysis Method: To ascertain what women farmer characteristics would have influenced the level of participation of rural women farmers in agricultural activities, we carried out backward stepwise profit regression analysis, where the analysis begins with a full or saturated model and variables are eliminated from the model in an iterative process. The fit of the model is tested after the elimination of each variable to ensure that the model still adequately fits the data (Hair, et al, 2007). Statistical tool of Correlation that was employed to assess the relationship between the level of participation in agricultural activities of rural women farmers and each of their selected characteristics revealed that Age, Number of Dependents, Kind of crops cultivated, and Land type negatively influenced participation levels whereas Education, Marital status, Landholding type, farming experience and the like positively influenced participation levels. The change in Attitudes of women towards agriculture, a critical component of our research was then analyzed statistically. “Change in agricultural output” due to varied participation levels of rural women farmers in agriculture is the next dimension of the research that was explored.

RESULTS:
General Characteristics of rural women farmers: The characteristics are broadly grouped under (i) Demographic profile comprising age, marital status, number of respondents, educational background, and income level. (ii) Land ownership profile including ownership status, size of landholding, kind of crops in the land used, and type of land. (iii) Participation factors: Experience in agriculture, Number of hours spent per day in agriculture, Participation in non agricultural activities etc.

Table 1.4: Participation in farm decision-making

Agricultural Activities	The extent of Participation in Farm Decision-Making		
	High (1)	Medium (2)	Low (3)
Pre-Harvest			
Crop selection	197	460	353
Seed selection	172	407	431
Fertilizer's selection	128	313	569
Agrochemical's selection	124	317	569
Mean	**155**	**374**	**481**
During Agriculture			
Selection of Plot	143	462	405
Sowing time	179	430	401
Harvesting time	215	427	368
Application of Pesticides	167	418	425
Mean	**176**	**434**	**400**
Post-Harvest			
Storage & Inventory	177	483	350
Sale of crops	149	436	425
Usage of farm income	148	486	376
Participation in farmers' association	106	305	599
Mean	**145**	**428**	**437**

It is implied from Table 1.4 that women farmers participated in decision-making related to agricultural activities but their extent of participation was found different in all agricultural practices performed at the farm level. From table 1.4, it can be inferred that among three practices, pre-harvest activities farm women participation in decision making was low with an average value of 481 out of 1010. During agriculture majority of farm women had a medium level of participation in decision making. Whereas related to post-harvest farm women had a low level of participation. Hence, the above analysis shows that the maximum participation of farm women was during agriculture. Women are key players in agricultural activities. Rural women play a vital role by working with full passion in the cultivation of crops from pre-harvest to post-harvest activities (Ahmed, 2004).

Table 1.7 Correlations between participation of farm women in agricultural activities and their characteristics

In order to assess the relationship between the level of participation in agricultural activities of rural women farmers and each of their selected characteristics, the correlation coefficient(r) were calculated

Sr. No.	Characteristics	'r' value
1	Age	-0.035
2	Education	0.174**
3	Marital status	0.099**
4	Number of Dependents	-0.108**
5	Land holding	0.009
6	Land ownership	0.106**
7	Farming experience	0.171**

8	Land type	-0.159**
9	Kind of crops	-0.038

** = Significant at 0.01 level

The analysis presented in Table 1.7 inferred that there was no significant relationship between the participation of women farmers in agricultural activities and their age. It can be concluded that women farmers irrespective of age, were participating in farming activities and it was not concerned with their age to participate in farming activities.

Correlation between decision making of farm women in agricultural activities and their characteristics:

Women are key players in agricultural activities. Rural women play a vital role by working with full passion in the cultivation of crops from pre harvest to post-harvest activities (Ahmed, 2004). Despite women's contribution to the family income through their participation in agriculture, no recognition is given and their contribution is not recorded. Women should be given more chances to participate in decision-making as they are actively involved in home and farm activities. Women's active participation in decision-making is considered essential for decision making for the rapid economic growth of the country.

Table 1.5: The overall rate of participation in farm decision-making

Level of farm decision making	Frequency	Percent
High	185	18.3
Medium	598	59.2
Low	227	22.5
Total	1010	100.0

It can be concluded that about 60 percent of farm women had a medium level of participation in farm decision making followed by 18 percent and 23 percent of farm women had a high and low level of participation in decision making. Thus, it can be inferred that the majority of rural women farmers had a medium level of participation in farm decision-making. This may be due to the reason that low confidence, lack of knowledge and, belief that women are subordinate to males in decision making. This finding was in line with the findings of *Chayal, 2017, M S Nain, 2010 and Aswar Unnati, 2012.*

Sr. No.	Characteristics	'r' value
1	Age	-0.145
2	Education	0.153**
3	Marital status	0.039
4	Number of Dependents	-0.065*
5	Land holding	-0.068*
6	Land ownership	0.122**
7	Farming experience	0.310**
8	Land type	0.043
9	Kind of crops	0.016

* Significant at 0.05 level

** Significant at 0.01 level

Probit regression analysis I: **(Participation in Farm activities)**

To ascertain what women farmer characteristics would have influenced the level of participation of rural women farmers in agricultural activities, we carried out backward stepwise probit regression analysis, where the analysis begins with a full or saturated model and variables are eliminated from the model in an iterative process. The fit of the model is tested after the elimination of each variable to ensure that the model still adequately fits the data (Hair, et al, 2007).

Table 5.11: Results of stepwise probit regression analysis

Variables	Coefficient	Standard error	Wald Chi-Square	Sig.
Age1	.751	.2734	7.540	.006
Marital status	-.242	.0993	5.939	.015
Education	.322	.0623	26.705	.000
Kind of crops	.306	.0941	10.613	.001
Experience in agriculture	-.210	.0769	7.470	.006
Number of observations				1010
Likelihood chi square				107.519
Prob>chi2				0.000
Log-likelihood				-305.692

The backward elimination stepwise profit regression model is statistically significant as indicated by the significance level of likelihood – ratio (LR) chi-square value. In this model, five predictors are implying that five of the 12 explanatory variables have a predictive influence on the participation of women in farming activities. Age2, Age3, Age4, number of dependents of respondents, land ownership, landholding, and land type did not have any positive influence on the dependent variables. One of the five predictors (variables), three have a positive influence and the other two have negative influences. While age group between 26 to 35 years, education, and kind of crops cultivated have a positive influence and marital status and experience in agriculture have a negative influence. These results require a detailed description.

Probit regression analysis II: **(Decision Making in Farm activities)**

To ascertain what women farmer characteristics would have influenced the participation of rural women farmer decision-making in agricultural activities, we carried out backward stepwise logistic regression analysis, where the analysis begins with a full or saturated model and variables are eliminated from the model in an iterative process. The fit of the model is tested after the elimination of each variable to ensure that the model still adequately fits the data. The results of the full backward elimination stepwise logistic regression model are presented in Table 5.11.

Table 5.11: Results of stepwise Logistic regression analysis

Variables	Coefficient	Standard error	Wald Chi-Square	Sig.
Age3	-.525	.2513	4.357	.037
Age4	-1.000	.2730	13.413	.000
Education	.205	.1044	3.870	.049
Land ownership	.515	.2176	5.612	.018

Kind of crops	-.556	.1500	13.738	.000
Experience in agriculture	.869	.1212	51.479	.000
Number of observations				1010
Likelihood chi square				159.530
Prob>chi2				0.000
Log-likelihood				-197.390

The backward elimination stepwise profit regression model is statistically significant as indicated by the significance level of likelihood – ratio (LR) chi-square value. In this model, six predictors are implying that six of the 12 explanatory variables have a predictive influence on the participation of women in decision-making in farming activities. Age1, Age2, marital status, family size, landholding, and land type did not have any influence on the dependent variables. One of the six predictors (variables), three have a positive influence and the other three have negative influences. While education, land ownership, and experience in agriculture have a positive influence, and age group between 36 to 45 years (Age3) and 46 years to 55 years (age4), and the kind of crops cultivated have a negative influence. These results require a detailed description.

The overall analysis brings out that education improves knowledge in agriculture and develops confidence among women to increase the level of participation in agriculture. Hence, Women farmers should be provided proper training and education in the agriculture field. Many women farmers do not own land that they cultivate, women who own land will have better access to improve their economic and social security which motivates them to improve participation in decision making in farming activities. Experience in agriculture increases the participation level of women farmers in decision making also increases. Hence women must be given equal opportunity to involve in agricultural activities.

Constraints to involvement in strategic farm activities: Despite having a medium level of participation in agricultural activities, rural women farmers were facing various constraints. Rural women farmers were asked to mention the constraints faced in participating in farm activities. They were asked on two-point rating i,e. yes or no and scores are assigned as 1 and 2 respectively. These findings were in line with the findings of *Deeksha (2014) and Monalisha (2018).* Mean scores were calculated for each constraint to assign rank. The analysis regarding the constraints faced by rural women farmers are presented in Table 1.6.

Table 1.6: Constraints for participation in agricultural activities

Constraints	**Mean**	**Rank**
Time constraints	1.39	VII
Water shortages	1.58	III
No own land	1.72	I
Financial constraints	1.43	V
Limited agricultural inputs	1.34	VIII
Price variation	1.40	VI
Difficulty in marketing	1.44	IV
Male Domination	1.68	II

DISCUSSION:

The Demographic characteristics revealed the following – the household head in the majority of the respondents was a Male, the age groups of 26 to 45 having the most concentration of the same. This further indicates the age-old tenet that the Man still plays a vital role in agricultural activities. The Education data revealed that the majority of rural women had studied up to the Primary/Secondary level. As far as the distribution of kinds of crops cultivated was concerned, married women prefer to cultivate food crops over commercial crops irrespective of their marital status. In the majority of the cases, the husband was the breadwinner of the family. Thus the head of the family, the land ownership, and that of a major source of income to the surveyed respondents all were Men, implying empowering women on equal grounds is called for, for her to actively involve herself in managing the farm. The monthly household income of the women farmers revealed a staggering decline in most of the respondents with the majority skewed between Rs. 2000 and Rs. 10000 per month. A reasonable percentage of women had their lands to take up farming thereby proving the gender inequalities that still exist in this space. This further has implications for land operation practices. The landholding pattern again revealed details that were dismal for women farmers – with the majority of them being classified as "small" farmers as compared to marginal and "big" farmers. The fact that women-owned land owing to inheritance also had limited space, thereby implying a need to re-look at the inheritance and ownership laws. A further classification of Landholding vis-à-vis the land type (irrigated vs Non irrigated) revealed that few women were having non-irrigated lands. Of the majority of marginal women farmers, a very low percentage of them held the non irrigated land. Thus women farmers here are well dependent on water from lakes and wells.

It is with this understanding of the demographic and socioeconomic profile of rural women farmers; we need to assess their level of participation in agricultural activities. The present study has made an effort to describe the same from the perspective of participation in various activities, frequency of participation, classification as per pre and post-harvest activities, the constraints encountered in the process, etc. Moreover, with the help of statistical analysis, the possible relationships between these variables and those of the demographic variables have been further investigated leading to worthy findings concerning the participation levels.

As a first, the experience of rural women in agriculture revealed that the majority of women had more than a decade of experience in farming and this belonged to the age group of 35 to 55 years. The majority of these women spend 5 to 6 hours a day in farming activities. As far as the time spent in non-agricultural activities is concerned, the number corresponds to 3 to 4 hours. Rural women thus balance their burden between the two, aiming to eke livelihoods out of their activities. The details on the 'type' of activity revealed that the majority of women were involved in Seeding followed by Land clearing, planting, and harvesting. The strategic aspect of "Marketing" is taken up by a very meager number, thereby indicating that rural women still need inclusion in policy aspects and that of decision-making aspects to ensure that their role is elevated. The overall participation in agricultural activities revealed that the majority of women feel they have a medium level of participation in either the pre-harvest or the post-harvest activities. The same is true even for the activities during agriculture.

The data on 'decision making' however revealed that women were indeed having a certain sense of liberty to take impactful decisions affecting their farm-related prospects. Among three practices, pre-harvest activities farm women participation in decision making was low with an average value of 481 out of 1010. During agriculture majority of farms, women had a medium level of participation in decision making. Whereas related to post-harvest farm women had a low level of participation. Hence, the above analysis shows that the maximum participation of farm women was during agriculture. It can be inferred that the majority of rural women farmers had a medium level of participation in farm

decision-making. This may be due to the reason that low confidence, lack of knowledge and, belief that women are subordinate to males in decision making. The constraints faced by women farmers in rural areas do deserve a special mention as their extent of participation in farming is largely shaped by constraints and shortcomings faced by them on a day-to-day basis.

Statistical tool of Correlation that was employed to assess the relationship between the level of participation in agricultural activities of rural women farmers and each of their selected characteristics revealed that Age, Number of Dependents, Kind of crops cultivated, and Land type negatively influenced participation levels whereas Education, Marital status, Landholding type, farming experience and the like positively influenced participation levels. It is appropriate to note that though the correlations were positive with a few of the variables, the extent to which they were strong enough in impacting participation levels was very less. Furthermore, Correlation analysis was made use of to assess the probable relationship between demographic characteristics of women farmers and their decision-making opportunities. Here it was deduced that Age, number of dependents, and landholding again had a negative association with the decision-making opportunities extended to women on the farm. However, marital status, Landholding type, farming experience, and the like positively influenced the decision-making aspects of rural women farmers. To ascertain what women farmer characteristics would have influenced the level of participation of rural women farmers in agricultural activities, a backward stepwise probit regression analysis was made use of. All the twelve explanatory variables were considered for the same. The model revealed that 7 out of 12 variables – namely certain age groups, number of dependents of respondents, land ownership, landholding, and land type did not have any positive influence on the dependent variables. Age group between 26 to 35 years, education, kind of crops cultivated have a positive influence and marital status and experience in agriculture have a negative influence.

Policy Implications:

In the light of the Summary of Findings described in the above pages, the present study has some important policy implications. The study is rather a first comprehensive one to throw light on elevating women's strategic role in farm management and land operation practices encompassing the four major South Indian states.

Firstly, it is clear that due to both internal and external factors, women's role in strategic decision-making areas of farm management is being reduced to a dismal position. Thus efforts have to be accentuated to enhance women's participation in the decision making processes of the farm. This representation needs to be done in committees such as district-level coordination, primary agricultural societies, block-level committees, livestock market and other economic policies and programmes. Secondly, as evident from the analysis, women have a meager role in involving themselves in the management of natural resources critical for farming success. Thus significant involvement of women in the use and administration of natural resources needs to be enhanced and policies for the same have to be drafted. This further has implications for resource extraction and achieves a sustainable Agri-food system.

To ensure women's attitudes towards farming as a profession/occupational choice is given attention to, policies that aim at providing gender assistive technologies, involvement of rural women in technology implementation, enhancing extension services, deliberating on better media and outreach programmes and efforts to elevate knowledge of women farmers in areas such as climate change, sustainable farming, agro-biodiversity etc have to be addressed in the policy initiatives. Also as inferred from the socio-demographic profile analysis of rural women farmers, land ownership, farmer registration and

issues pertaining to the same influence the rural women's involvement levels in agriculture. Thus an alternative approach of registration of farmers based on certifying women farmers and other groups by village/Panchayat level functionaries in records of cultivation is the need of the hour. This way easier access to benefits, credit, insurance etc would be facilitated. It was also evident in the findings that women had larger issues in pre-harvest activities concerning areas of seeding and water management. This coupled with agro-diversity and the dynamics of agricultural change need to be addressed from a gender perspective. Initiatives such as the capacity building of women, training on seed production practices, certified seeds' collective production etc would refocus women's role in enhanced seed production.

The research presented a lack of involvement in post-harvest activities of managing the farm and involvement of rural women in trivial aspects of a farm's value chain as pertinent issues that had to be tackled to ensure increased participation of women in agriculture. Policymakers need thus to take cognizance of the value chain activities such as post-harvest processing, transportation, storage, marketing and sales that women could take up to foster their role in farming. Better linkages between rural women farmers and entrepreneurs can help stimulate resource and market access were traders, retailers, transporters; processors participate to enhance their respective goals. Technology is uncharted territory for most of the women farmers in rural India. Though efforts have been made in this regard by policymakers – as evident from our research, much needs to be done to exploit the potential. Research on agriculture needs to be re-oriented towards technology adaptation that takes cognizance of women's physical attributes and their ergonomic relationships. Resource-efficient methods such as dynamic cropping patterns, ICT usage, high-density plantation, protected horticulture, organic farming etc need overhaul – in terms of options to be explored to provide access conducive to women have to be covered in policymaking.

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