Agricultural Economics Research Review 2019, 32 (1), 133-142
DOI: 10.5958/0974-0279.2019.00012.0

Research note

Differential pattern in labour use on male vs female managed farms and its economic consequences : a case study from Manipur, India

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Abstract Male domination in farming and farm management is slowly losing its hold world-wide, especially in the third world countries. In India, about one-fourth of the total farm households are managed by females. This paper examines the gender dimensions in agriculture utilizing data from a survey of 120 households distributed over two valley districts in Indian state of Manipur. Our findings indicate that there remains crop-specificity, operation-specificity and source-specificity in labour use by gender. Females are found to be dominant in non-traditional crops (e.g., tomato, mustard and peas). The female-managed households also hire more of females. Important operations like sowing, harvesting and weeding are mostly performed by female labourers and female-employers. Increased cropping intensity by bringing more and more non-cereal crops in the cropping system favours engagement of more female labourers which may be helpful both in crop diversification and in enhancing farm income. Farm mechanisation has a positive influence on female employment.

Keywords Female managed households, Labour use pattern, Factors of labour demand

JEL classification Q12, J16

1 Introduction

Human labour employment in farming and related activities has always been a critical issue and it is gaining more importance in the changing context of farming systems. The phenomenon of labour migration coupled with mechanization and rising wage rates are compelling the employer-farmers to rethink on engagement of labour in farming. Whether to engage machine labour or human labour in a farming operation (say, harvesting or land preparation or transplanting) is a decision-making issue, no doubt. Again, for human labour, the decision pivots around the question of male or female labour engagement in a farming operation as gender-specificity for differential farm operations is on the verge of being fading away. It is important as the labour cost determines to a great extent the profitability of farming.

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There happens to be both males and females in the labour market. Although, women's entry into labour market is essentially a result of poverty (Agarwal 1986), their contribution to food production is immense (Giriappa 1988; Aggarwal et al. 2003; Suneeta 2014). Management of farming, which was once a monopoly of males, is slowly paving the way for females, especially in the developing countries. Inability of sole farming occupation to cater to the need of ever-rising farm and family expenditure is one of the prime reasons to push the male counterpart in a nuclear family towards complementary occupation(s) resulting in compulsion on the part of females to manage the farming. Clearly, there exist farm households headed or managed by women (and hence called 'female-managed households') along with the 'male-managed farming households' (management decision mainly undertaken by the males in the family). Presently, there are about

22 million women cultivators (Census, 2011) comprising about 23% of total cultivators in the country. It is a fact that women's participation in farming is pre-historic but their contribution to farming was grossly ignored, at least, in economic terms. The role of female as a co-farmer or as a manager of the farm is vital in today's agribusiness world.

This study was conducted in Indian state of Manipur where 50.37% of total population are women (Das & Thingbaijam 2016). Moreover, the state has a matriarchal society where 39% of the total workforce consists of women (Thingbaijam & Das 2015). The women, in the state, have a historic past in protecting their rights and privileges, in general. Presently, female cultivators (12.80 lakhs) have almost 50% share in the total cultivators in the state. It is of interest that whether the female cultivators outperform their men counterparts in terms of labour use and ultimately in 'farm economics' or not. Therefore, the main focus of this study rests on understanding the differential pattern in labour utilization in farming by female-managed and the male-managed households.

2 Materials and methods

Manipur has nine districts, of which five namely, Senapati, Tamenglong, Churachandpur, Chandel and Ukhrul are hill districts and others namely, Imphal West, Imphal East, Bishnupur and Thoubal are valley districts (Government of Manipur 2012-13). The valley districts are relatively more populated with about 64% of state's total population, have a greater share of both net cropped (52%) as well as gross cropped area (56%) and have higher cropping intensity (155% against 130% for hill districts). Therefore, this study was undertaken in two valley districts namely, Thoubal and Imphal East. About 67% and 40% of the main workers in Thoubal and Imphal East, respectively depend directly or indirectly on crop farming. Also, in terms of female main workers, corresponding figures are greater; 50% in Thoubal and 59% in Imphal East.

A total of 120 sample respondents (60 male-managed farming households, 60 female-managed farming households) equally distributed over these two valley districts constitute the sampling unit. Farm households (with a distinct knowledge about operational decision-making and management) in a village are enlisted first and then the technique of randomization is applied in both the 'strata' (male-managed households and female-managed households) for undertaking door-to-door survey for extracting the required information. The farm households are distributed over three villages in each district. Standard statistical tools are used for evaluating the comparative parameters of male- and female-managed households. The survey was conducted during 2013-14.

3 Results and discussion

The aspect of labour employment may be looked from both the demand and supply perspectives. While the demand side of labour employment is embedded in the marginal productivity approach, the supply side analysis is based on individual preferences between work and leisure or between work and education (Unni 1992). While a female labourer is being given with a set of conditions (sometimes compelling and sometimes natural) to guide her towards offering for wage earning, an employer-farmer (male or female) is also to consider the social conditions (along with the technical requirement) for engaging the labourers.

Table 1 describes the major socio-economic characteristics and exhibits greater dependency (around 90%) on farming in both male-managed and female-managed households in the districts. Family size of a female-managed household is slightly less (5.55) compared to the counterpart male-managed household (5.88) although they have more number of females per male (1.12 vs 0.83). Idea about educational background has been elicited by obtaining educational 'score' of a farm family through weighted average method (Pandit et al. 2004). A score has been assigned to each of the family member as illiterate : 0, up to primary : 1, secondary : 2, graduation : 3, and post-graduation : 4. The method of 'weighted average' is applied for arriving at the score for family education. This educational score of an individual reflects his/her standard of education. Thus, the average standard of education of managerial head ranges from 1.23 – 1.30 in female-managed households and from 1.10 – 1.37 in the male-managed households.. That is, the average education of both these managerial heads remains just above primary level but well below secondary level.

On the other hand, social participation is thought to play an important role in farm performance or livelihood improvement (Reddy 2003; Sreedevi 2003).

Table 1. Major demographic traits of male vs female managed farming households

Traits	Unit of expression	Thoubal		Imphal East	
		Female-managed farming	Male-managed farming	Female-managed farming	Male-managed farming
Size of farm family	No.	5.43	6.00	5.67	5.77
Male – female ratio	-	1 : 1.24	1 : 0.89	1 : 1.10	1 : 0.76
Incidence of nuclear family	% of households	70.00	43.33	80.00	76.67
Education of family head	Score	1.23	1.37	1.30	1.10
Age of family head	Years	48.33	50.77	46.57	44.27
% of household having exclusively sole farming	% of households	30.00	53.33	36.67	60.00
Share of farming in farm family income	%	89.03	88.00	88.80	91.07
Social participation	Score	1.87	3.27	2.07	3.17

It is an indicator of 'dynamism' on the part of the decision-making head of the family. The sampled individuals are asked about their awareness or frequency of visiting to various relevant and necessary social institutes like Gram Panchayat Office, Land Revenue Office, Office of the Department of Agriculture (DoA), Commercial and Co-operative Banks, Krishi Vigyan Kendra (KVK), Departments of Agricultural University, Farmers' Club, Office of the Non-Government Organisation (NGO), etc. A score for cosmopolitanism behaviour has been arrived at for every single respondent by counting the number of social institute(s) he/she had visited or being aware of these. On an average, the farmers are aware of only 2-3 institutions and there remains significant ($p \leq 0.01$) differentiation among employer-farmers on the knowledge/awareness/visit of the institutes. Male-managed households are relatively more progressive in this regard.

In Manipur, women's role in the socio-economic and cultural life is significant. They have always played a very vital and active role in social movements. *Marup* or cooperative movement is one of such movements spearheaded by women for creating income generating opportunities and to accord them high status in the society. Quite significantly, we find a certain proportion (30-40%) of the female-managed households where a female owns, by record, land in her name (table 2).

Irrespective of the fact whether managed by male or female, paddy (*kharif*) is the principal crop being cultivated almost in the entire net cropped area (NCA). Other crops (in different seasons) are potato, cabbage, peas, tomato, rapeseed & mustard and seasonal vegetables. Both female-managed households and male-managed households fail to utilise full potential of their respective net cultivable area and therefore, the cropping intensity remains close to 150% (table 2)

Table 2. Land and land utilization

Farming traits	Unit of expression	Thoubal		Imphal East	
		Female-managed farming	Male-managed farming	Female-managed farming	Male-managed farming
Net cropped area	ha	0.66	0.79	0.70	0.97
Record holding status	% of households	43.33	60.00	33.33	70.00
Intensity of cropping	%	156.07	148.10	144.29	151.55
Major crops grown	-	Kharif paddy, potato, cabbage, peas and tomato		Kharif paddy, potato, cabbage, peas and mustard	

Table 3. Crop wise labour utilization - male vs female managed farming households (man-days ha^{-1})

Crops	Thoubal		Imphal East	
	Female-managed farming	Male-managed farming	Female-managed farming	Male-managed farming
Kharif paddy	187.03 (34.74)	211.28 (31.19)	168.10 (31.56)	205.22 (31.15)
Potato	597.20 (53.41)	277.27 (45.10)	481.06 (47.30)	283.79 (40.52)
Cabbage	512.92 (44.75)	441.92 (47.75)	413.75 (43.00)	404.34 (42.99)
Peas	226.60 (54.43)	220.00 (56.54)	210.00 (52.69)	220.50 (56.05)
Tomato/ Mustard	373.63 (48.34)	315.38 (47.40)	108.00 (53.21)	106.77 (49.66)
Total	372.35 (45.33)	374.91 (42.74)	357.02 (42.63)	309.35 (39.45)

*Figures in parentheses indicate corresponding share of female labourer

A faming household, with cropping intensity of around 152%, may employ 374 man-days per hectare of gross cropped area in Thoubal; and with a cropping intensity of around 148%, may employ 333 man-days per hectare of gross cropped area in Imphal East (table 3). Per hectare labour employment is relatively and significantly ($p \leq 0.01$) more (364 man-days vs 342 man-days) in case of female-managed households, on an average. If we go for gender cross section of the employed labourer, it is shown that male-managed households employ about 41% and female-managed households employ about 44% female labourers on their farms (table 3). It implies that agriculture in both the districts is male dominated and male domination is more visible in the case of male-managed households. However, the share of female laborers is relatively higher in the bulk of hired labourers, a result similar to that was reported by Balasubramanian et al. (2002).

The gender-partitioning of the total labour utilized shows crop-specificity in labour use. In kharif paddy cultivation (the most important crop), a complete bias is noticed in favour of the male labourers (table 3). In contrast, Sujaya (2001) found greater contribution of women labourer in rice cultivation. However, in pea cultivation 54-56% of employed labour is supplied by females. In other crops, male and female labour use is in the approximate ratio of 55:45. In a study, Bala et al. (2000) reported a higher contribution of females in the case of cash crops compared to the traditional crops.

Kharif paddy, the principal crop in the cropping system, accounts for bulk (35% in Thoubal and 39% in Imphal East) of the total labour utilized. Labour utilization is the least for tomato in Thoubal and rapeseed & mustard in Imphal East. But there is a distinct differentiation between crops regarding the type of labour utilized. Kharif paddy cultivation is mostly dependant on hired labour; crops like peas and tomato (in Thoubal) are largely cultivated using family labour. Between 60-72% of total labour in kharif paddy is supplied from outside. In other crops, this proportion is about 50%. Again, the use of hired labour in kharif paddy cultivation (72%) is relatively more in female-managed farming households, while the use of family labour is more in cultivation of peas and tomatoes (table 4).

As has been mentioned earlier, farm-females do participate in most of the farm activities of debris cleaning, seed sowing/transplanting, weeding/ intercultural operations, harvesting and post-harvest operations (Saikia 1999). Now, it is our interest to identify 'spatiality', if any, engagement of farm women in different farm operations. It is revealed that employer-farmers, in general, are cautious about choosing the type of labour for various farm operations. Farm operations like land preparation, application of manures, fertilizers and pesticides and irrigation are mostly carried out by males. In these operations, the contribution of male labourers is about 75 to 90% in Thoubal and even higher in Imphal East (table 5). This means the male agricultural labour dominates in employment as they are preferred for strenuous jobs (Prasad et al. 2000).

No such dominance in labour participation could be traced for farm women in any of the crop operation. However, there are some farm operations (like sowing or transplanting, harvesting and post-harvest operations like stacking, winnowing and threshing) where female labourers are used in a higher proportion. Similar results were reported by Geethalakshmi et al. (2002); Karmana (2010) which showed that women provide 70-75% of the labour for sowing/transplanting.

The average kharif paddy yield on female managed farms is about 22% and 11% less than on male managed

Table 4. Source wise labour utilization - male vs female managed farming households (man-days ha^{-1})

Crops	Labour supply source	Thoubal		Imphal East	
		Female-managed farming	Male-managed farming	Female-managed farming	Male-managed farming
Kharif paddy	Family	52.82 (34.04)	82.97 (29.52)	47.06 (33.91)	66.90 (28.03)
	Hired	134.21 (35.01)	128.31 (32.27)	121.06 (30.65)	138.34 (32.66)
Potato	Family	310.25 (43.42)	115.24 (39.63)	244.44 (39.71)	106.32 (34.54)
	Hired	286.96 (53.44)	162.03 (45.02)	284.72 (47.23)	177.47 (44.11)
Cabbage	Family	271.08 (40.36)	250.25 (39.91)	215.00 (37.98)	190.08 (39.01)
	Hired	241.85 (44.69)	191.67 (54.32)	198.75 (48.39)	214.26 (45.97)
Peas	Family	160.90 (46.79)	154.25 (53.65)	146.67 (47.67)	138.00 (45.93)
	Hired	66.99 (71.67)	65.75 (60.78)	63.33 (64.15)	82.50 (72.31)
Tomato/Mustard	Family	271.43 (47.41)	217.31 (44.45)	44.57 (30.52)	46.00 (17.28)
	Hired	102.20 (50.38)	146.15 (51.41)	63.43 (72.18)	60.67 (74.06)

*Figures in parentheses indicate corresponding share of female labourer

Table 5. Operation-wise annual labour utilization - male vs female managed farming households (man-days ha^{-1})

Farm operations	Thoubal		Imphal East	
	Female-managed farming	Male-managed farming	Female-managed farming	Male-managed farming
Land preparation	201.03 (3.18)	208.97 (8.09)	138.92 (0.00)	201.58 (1.59)
Seed sowing/transplanting	181.03 (72.82)	160.92 (74.96)	119.46 (75.16)	142.11 (69.40)
Manure and fertilizer	59.49 (28.42)	52.53 (24.99)	41.61 (17.19)	46.58 (9.08)
Weeding / inter-culture	111.67 (50.26)	96.55 (45.76)	82.90 (45.81)	89.74 (43.46)
Irrigation	57.69 (14.34)	55.75 (17.71)	41.08 (5.04)	48.60 (5.03)
Harvesting	218.59 (66.16)	184.58 (59.16)	145.59 (61.57)	153.33 (60.93)
Post-harvest	151.15 (52.40)	109.66 (55.52)	106.13 (52.47)	113.86 (53.15)
Marketing	88.08 (38.92)	69.54 (38.11)	69.14 (35.85)	68.86 (42.84)
Total	372.35 (45.33)	374.91 (42.74)	357.02 (42.63)	309.35 (39.45)

*Figures in parentheses indicate corresponding share of female labourer

Table 6 (a). Farming performance in Thoubal: male vs female managed farms

Variables	Female-managed ('000 Rs. / ha)					Male-managed ('000 Rs. /ha)				
	Kharif paddy	Potato	Cabbage	Pea	Tomato	Kharif paddy	Potato	Cabbage	Pea	Tomato
Yield *	3.51	14.05	32.68	4.02	4.45	3.95	12.94	31.84	4.72	2.79
Return over Cost A_1	27.98	94.14	120.18	101.50	91.50	42.31	90.29	130.65	117.83	56.39
Return over Cost C_1	15.15	42.98	73.08	85.51	77.04	23.45	69.71	83.33	98.95	49.77
Return per man-days@	0.28	0.20	0.18	0.18	0.16	0.24	0.39	0.18	0.18	0.21
Output-input ratio	1.24	1.29	1.56	3.45	3.58	1.36	1.65	1.72	3.32	3.91

*tonnes/ha; @, 000 Rs. per man-day

Table 6(b). Farming performance in Imphal East : male vs female managed farms

Variable	Female-managed ('000 Rs. / ha)					Male-managed ('000 Rs. / ha)				
	Kharif paddy	Potato	Cabbage	Peas	Mustard	Kharif paddy	Potato	Cabbage	Peas	Mustard
Yield *	3.69	12.00	19.69	1.89	0.97	4.71	13.08	27.31	2.12	1.02
Return over Cost A_1	35.18	88.70	76.46	48.35	39.10	57.28	98.44	104.60	50.43	66.84
Return over Cost C_1	24.12	50.56	51.41	41.62	37.01	41.24	79.25	71.96	42.01	63.08
Return per man-days@	0.28	0.21	0.19	0.18	0.34	0.26	0.35	0.21	0.20	0.33
Output-input ratio	1.41	1.79	1.73	2.96	4.28	1.64	1.61	1.73	3.29	4.33

*tonnes/ha; @, 000 Rs. per man-day

Cost C_1 is calculated following standard Farm Management cost concepts as follows :

Cost C_1 = Cost B_1 + Imputed value of family labour

Cost B_1 = Cost A_1 + Interest on value of owned fixed capital assets (excluding land)

Cost A_1 = Prime Cost + Interest on working capital @12.5 per cent + Depreciation and repairs of farm tools and machinery (computed through apportioning method)

Prime Cost items : Value of hired human labour, Value of owned & hired bullock labour, Value of tilling machine (owned + hired), Value of seed materials (both farm produced and purchased), Value of organic manure (owned + purchased), Value of chemical fertilizers, Value of plant protection chemicals, Irrigation charges (owned +hired), Land revenue and taxes, Miscellaneous expense (hiring of sprayers, buying of ropes and many such non-plan expenditures).

farms in Thoubal and Imphal East, respectively, and the difference (table 6) is statistically significant ($p \leq 0.01$). It is also observed that female employer-farmers 'lagged' in net return too. Per hectare net return over cost C_1 for male-managed farm households is almost 50% higher than that of female-managed farm households. Thus, output-input ratio is 1.00:1.24 for female-managed households as against 1.00:1.36 for male-managed households in Thoubal; and the corresponding ratios are 1.00:1.41 and 1.00:1.64 in Imphal East. A similar trend is observed for all the major crops. One of the possible reasons may be the relatively low standard of education, less social participation and consequently 'not so good' managerial ability of the female-employer farmers.

It is the fact that farm females are as efficient as their male counterparts. Several studies (Thapa 2008; John-Muoh et al. 2015; Njuki et al. 2006) indicate that they produce less because they control less land, have less financial leverage, have less access to important services such as extension advice, etc. Also, continuous imbalanced use of plant nutrients (which is due to less exposure of females) results in fertility degradation in their cultivable land and ultimately less output. Moreover, they shoulder the simultaneous responsibility of 'smooth running' of the family. Closing the gender gap in access to and use of productive resources and services may unlock the productive potential of women and could increase the output substantially.

The male and female managed farm households differ significantly in terms of labour employment, especially the female labour. It is the fact that choice regarding gender of employed labourer is a managerial decision and many factors may be associated with this. Important factors like net cropped area, extent of rice acreage, intensity of cropping, bulk of human days employed round the year, educational level of farm family head, mobility/dynamism of family head, diversification, caste and extent of farm mechanisation are assumed to have a bearing on female labour utilization (demand). Of these, the educational standard, mobility, diversification and caste were obtained by assigning/ calculating relevant 'scores'. It was the point of interest that whether the nature of crop diversification has any effect on labour utilization or not; and for diversification, the score for sole kharif paddy was assigned as '1' and for other crops as '0'. Similarly, for general caste was assigned as '1' and for other castes as '0'. Influence of all these explanatory determinants is being explored with the help of multiple regression technique. The Ordinary Least Square (OLS) method was used for the purpose.

The equation to be estimated is : :

$$Y_i = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + \varepsilon_i$$

where, Y_i is the total number of female labour days (per ha) utilized round the year, X_i is the vector of determinants of female labour use and β_i is the associated vector of regression coefficients. Linear form of multiple regression equation is applied and the results are presented in table 7.

In order to avoid selecting auto-correlated independent variables Durbin-Watson test is performed. Also, the explanatory variables are subjected for detection of 'multi-collinearity' by identifying Variance Inflation Factors (VIF). As VIF for all the explanatory variables

Table 7. Determinants for female labour demand

Explanatory variables	Regression coefficients			
	Thoubal		Imphal East	
	Female-managed	Male-managed	Female-managed	Male-managed
Net cropped area (ha)	27.95	1.45	29.68	28.62**
	(38.04)	(12.86)	(24.82)	(13.37)
Area under kharif paddy (ha)	-65.98**	-50.96**	-45.37**	-45.01***
	(23.76)	(19.08)	(17.76)	(13.56)
Cropping Intensity (%)	0.21	0.16	0.13	0.26***
	(0.14)	(0.10)	(0.08)	(0.07)
Total labour utilization per ha per year (man-days)	0.47***	0.14	0.49***	0.10
	(0.06)	(0.10)	(0.04)	(0.06)
Education of family head (score)	0.39	-0.16	-1.76	1.90
	(2.16)	(1.63)	(2.63)	(1.37)
Mobility (score)	2.78*	0.40	-1.23	1.77**
	(1.51)	(1.19)	(1.44)	(0.79)
Crop diversification (score)	-3.62	-4.16	-0.64	-6.78**
	(4.81)	(5.34)	(5.95)	(2.71)
Caste composition (score)	-2.63	-2.15	1.36	-4.35
	(3.22)	(3.85)	(8.40)	(4.27)
Farm mechanization (hrs/ha/annum)	2.21	3.03**	0.21	1.29*
	(1.65)	(1.10)	(0.75)	(0.64)
Adjusted R^2	0.89	0.61	0.94	0.79
F	25.95***	6.13***	48.16***	13.13***

***Significant at 1% level, ** Significant at 5% level, * Significant at 10% level. Figures in parentheses indicate value of Standard Error to the corresponding regression coefficient.

remain below 20, it can be assumed that the variables are independently regressing the variance in the dependent variable (i.e., female labour utilization in farming) and they do not have linear correlation between them.

The regression analysis is performed separately for female-managed and male-managed households (table 7). Higher values (0.61-0.94) of adjusted R^2 in all the regression equations indicate the strength of the assumed variables in explaining the variation in dependant variable (i.e., the female days utilized). The multiple regression equations are highly significant ($p \leq 0.01$).

A perusal of table 7 indicates that kharif paddy acreage has a significant ($p \leq 0.01$) and negative effect on female labour employment in both the districts and in both the male-managed and female-managed households. The intensity of cropping has a positive influence (highly significant for male employer-farmers in Imphal East) on female labour use. These findings are similar to those reported in Saikia et al. (1999) and Singh et al. (1999). The observed phenomenon does suggest that increase in cropping intensity with non-cereal crop diversification may be beneficial for female labour employment. More and more allocation under non-traditional crops like cabbage, peas and other vegetables may be considered for diversification (Balasubramanian et al. 2002).

Another important factor that favourably and significantly influences (especially, on male-managed farms) the female labour employment is the mechanization. Extent of mechanization was measured by estimating the use (total hours/ha/annum) of 2-wheeled power tiller or 4-wheeled tractors. It is observed that increased use of machine hours replaces male labours, paving way for the increased use of the female labours. The surplus male labour goes for migration and thus paves way for engaging more female labourers. Similar observation was made by Singh et al. (2000). While tilling the land with tractor/ power tiller, some light work is associated, which is carefully and easily carried out by females. So, a positive relation is found. Of course, the possibility of female labour utilization increases with increase in the labour employed in farming.

Size of land holding has a universal positive effect on female labour employment. It is highly significant ($p \leq 0.01$) on male-managed farms in Imphal East. Quite a contrasting observation was reported by Tuteja (2000) and Balasubramanian et al. (2002).

Farm family head's dynamism (mobility) has positive influence on female labour utilization. Level of education and caste composition have an insignificant effect on female labour employment. Interestingly, crop diversification increases reliance/dependence on female labour.

4 Conclusions

The study has examined labour employment on male-managed and female–managed farms and observes a numbers of peculiarities. The male-managed farms outperform their female counterparts in economic performance –total cost of cultivation or gross margin or technical efficiency. A number of reasons may be put forward for low performance of female managed farms. Although it is a matriarchal society, females are grossly ignored in capacity building programmes, exposure to institutes/organisations or other extension facilities. As a result, their farming knowledge gets little scope for refreshment or updating. Again, alongside farming, females have to shoulder the burden of domestic works. May be due to such factors, managerial 'incompetence' of the female-managed farm households is higher leading to lower yields and farm profits. Experience, education, dynamism, access to inputs and participation in awareness campaigns or training programmes are important factors in enhancing the managerial skills of female farmers.

In terms of gender of labourer (whether to employ a male or female), the study observes crop-specificity, operation-specificity as well as labour-source specificity. The female-managed households engage more of females when hired from outside. The operations like seed sowing, harvesting, weeding are mostly undertaken with the help of female labourers, and the female employers use more of them than their male counterparts.

Increased cropping intensity and crop diversification by bringing more and more non-cereal crops in the cropping system favour engagement of more female labourers and this is irrespective of the 'management' pattern. Focus on agribusiness attitude is thought to be a way of improving the family income in this area. Females get little opportunity to visit and interact with

functionaries for upgrading their knowledge and information. Formation of 'farm school' led by female farmers, enhanced and regular exposure visits, frequent interactions with extension agencies may help in this regard.

Acknowledgement

The authors are indebted to the farming households of study area in Manipur for their lively interaction and support during data collection. We would like to convey our sincere thanks to anonymous referee(s) for their valuable suggestions, critical assessment and encouragement.

References

Aggarwal, S., Khanna, K., & Malhan, S. (2003). Quality of life of farm women. Abhijeet Publications, New Delhi.

Agarwal, B. (1986). Women, poverty and agricultural growth in India. The Journal of Peasant Studies, 13:4.

Bala, B., Sharma, R. S., & Sharma, S. D. (2000). Contribution of tribal women in the cultivation of high value cash crops in Himachal Pradesh. Agricultural Economic Research Review, 13(2), 151-158.

Balasubramanian, K., Tamizoli, P., & Murugakani, S. (2002). Labour, market linkages and gender : case study of a village in Tamil Nadu. Economic and Political Weekly, 37(43), 4390-4396.

Das K. K., & Thingbaijam, L. (2016). Farming performance in women-led-agriculture: a comparative look. Family Farming: challenges and opportunities. Renu Publishers, New Delhi.

Geethalakshmi, G., Raghuprasad, K.P., & Suresha, S.V. (2002). Comparative study on the farm activities performed by landless farm women labourers in the irrigated and rainfed areas of Shimoga District. Current Research – University of Agricultural Sciences, Bangalore, 31(5/6), 99-100.

Giriappa, S. (1988). Role of women in rural development. Daya Publishing House, New Delhi.

GOI (Government of India). Various years. Census of India. Ministry of Home Affairs, New Delhi.

GOM (Government of Manipur). 2012-13. Directorate of Economics and Statistics, Government of Manipur, Imphal.

Muoh, J., Sukoya I., Kwame R. W., & Yangari, O. (2015). Analysis of gender differentials in technical efficiency of smallholder rice farmers in Ashanti region of Ghana. International Journal of Agricultural Research and Reviews, 3 (2), 113-121.

Karmana, P. (2010). Participation of rural women in agricultural operation - a study. Bhartiya Krishi Anusandhan Patrika, 24, 64-67.

Koutsoyiannis, A. (1987). Theory of econometrics: an introductory exposition of econometric methods. ELBS with Macmillan, Great Britain.

Montgomery, D.C., & Peck, E.A. (1982). Introduction to linear regression analysis. John Wiley & Sons, New York.

NCW (National Commission for Women). 2004. Report of the National Task Force on technological empowerment of women in agriculture.

Njuki, J. M., Kihiyo, V. B. M., O'ktingati, A. (2006). Productivity differences between male and female manged farms in the eastern and central highlands of Kenya. Presented at the International Association of Agricultural Economists Conference, Gold Coast, Australia, August 12-18, 2006.

Pandit, D., Ghosh, S., & Roy, T. N. (2004). Studies of farmers characteristics and their behaviour in adopting sericulture technologies. Journal of Interacademicia, 8, 290-301.

Prasad, S., Singh, R. K. P., & Choudhary, A. K. (2000). Employment and income pattern of agricultural labour households of Bihar - a village level study. Economic Affairs, 45(3), 174-182.

Reddy, G. (2003). Farming performance of farm women. Concept Publishing Company, New Delhi.

Saikia, A. (1999). Farm women of Assam - effect of cropping pattern on employment of farm women and extent of adoption of improved practices. Agricultural Economic Research Review, 12(2), 151-159.

Singh, B., Prasad, V., Prabha, S., & Kumar, B. (1999). Impact of changing cropping pattern on women's participation in crop production. Indian Journal of Agricultural Economics, 54(3), 313.

Singh, V. N., Jaulkar, A.M., & Raghuwanshi, J.S. (2000). A case study of the effect of free and assertive movement of male agricultural labour on rural labour market in Gwalior district, Madhya Pradesh. Indian Journal of Agricultural Economics, 55(3), 343-345.

Sreedevi, T.K. (2003). Improving rural livelihoods through convergence in watersheds of APRLP. Integrated Watershed Management for Land and Water

Conservation and Sustainable Agricultural Production in Asia. Proceedings of the ADB-ICRISAT-IWMI Project Review and Planning Meeting, Hanoi, Vietnam.

Sujaya, C. P. (2001). Climbing a long road : women in agriculture in India: ten years after Beijing. Research Abstracts on Women Empowerment.

Suneeta, M. (2014). Female labour participation in agriculture: a case of AP. Agricultural Situation in India, 15, 46-52.

Thapa, S. (2008). Gender differentials in agricultural productivity: evidence from Nepalese household data. MPRA Paper No. 13722.

Thingbaijam, L. & Das, K. K. (2015). Status of women in Manipur - a comparative look. Economic Affairs, 60(4), 761-768.

Tuteja, S. (2000). Contribution of female agricultural workers in family income and their status in Haryana. Indian Journal of Agricultural Economics, 55(2), 136-148.

Unni, J. (1992). Occupational choice and multiple job holding in rural Gujrat, India. Yale Economic Growth Centre.

Received: January 2018; Accepted: December 2018