Ind. Jn. of Agri.Econ.
Vol.63, No.3, July-Sept. 2008

Impact of Technological Change on Women Workers in Dry Land Agriculture Area of Uttar Pradesh

Archana Shukla*

I

INTRODUCTION

In recent years greater attention has been paid to the development and dissemination of technologies and management practices for dryland areas, which are also the areas most prone to poverty. In such areas, women participate in significant numbers in all agricultural activities. However, few, if any, assessments of the impact of new technologies focus on the impact on women-not just in terms of female employment and wages, but also in terms of women's ability to participate effectively in the decision-making process, in matters relating both to agriculture and domestic management. The present study makes an attempt in this direction. In particular, we consider employment patterns, time disposition, wages, labour productivity, and decision making under three distinct scenarios: first where extension efforts have successfully transmitted information about new dryland districts in the state of Uttar Pradesh. The study thus complements the literature on the subject for other states (e.g., Joshi and Alshi, 1985; Rani, Vyas and Jodha, 1993; Varghese, Varghese and Jaitwat, 1999).

II

DATA AND METHODOLOGY

The paper is based on an analysis of data collected from Bundelkhand region of Uttaranchal, through a survey conducted during August and September, 2006. Data were collected on prescribed proforma through specially designed schedules for the study by surveying 180 households. Each selected household had women who participated in farming activities. The sample was drawn from three villages with similar agro-climatic (semi-arid) and soil conditions (red and dubba soils), but each of which represented different levels of awareness and exposure to new technology, as noted below.

High-awareness: Khangura village, where farmers were exposed to new dryland crop production technologies through special extension efforts, and by farmers attending Kisan melas conducted by institutes such as the Uttar Pradesh State

*Lecturer Economics, D.B.S. P.G. College, Govind Nagar, Kanpur - 208 012 (Uttar Pradesh).

Department of Agriculture, Central Research Institute for Dryland Agriculture and International Crops Research Institute for the Semi-Arid Tropics. These extension efforts also resulted in some changes in cropping patterns.

Low-awareness: Belagaon, a tribal village, where farmers were not exposed to new dry land crop production technologies.

Partial-awareness: Semara village, where farmers had partial knowledge about the new dry land farming technologies through a source of extension education.

The first two villages are located in Jhansi district and the third in Lalitpur district of Uttar Pradesh. A stratified random sampling technique was followed in selecting the households at each of the three selected villages. Sixty women respondent households consisting of 12 each from landless marginal (<1.0 ha), small (1-2 ha), medium (2-4 ha) and large (> 4.0 ha) size holding categories were selected from each village in both the districts. The data collected for this study relates to the agricultural year 2005-06.

For each household, the study collected detailed information on employment and wages. In assessing women's participation in agricultural activities, we adopted a procedure similar to that used by the Census, which includes both cultivators as well as agricultural labourers in determining the agricultural work force. Further, in comparing wages, it was found that wage rates vary across villages partly on account of differences in the number of hours worked. Therefore, we computed money wages in terms of Rs./hour, so as to enable a comparison of male-female wage differentials per unit of time under the different awareness situations. In the process, we also collected detailed information on the number of hours spent by men and women in various activities (including agricultural as well as domestic work); this enables a more comprehensive comparison of the relative burden of work shouldered by men and women.

Besides data was also obtained data on yields and prices, so as to calculate the level of output per worker (at current market prices); this calculation was based on the procedure adopted by the Central Statistical Organisation. In cases of intercropping or mixed cropping, we worked out the grain equivalent of the inter/mixed crop vis-à-vis the first crop, and used this to work out the total output.

To assess whether there are significant differences between male and female labour productivity in each crop, and to examine whether these were consistent with observed wage differentials, we estimated a Cobb-Douglas production function, with inputs area, male labour use and female labour use. In logarithmic form, the equation is give by:

$$\text{Log } Y = \log a + b_1 \log X_1 + b_2 \text{ Log } X_2 + b_3 \text{ Log } X_3 + U$$

Where,

Y = Productivity of a crop is quintals/ha,
X_1 = Area under the crop in hectares,

X_2 = Male labour use in days/ha,
X_3 = Female labour use in days/ha,
a = Constant,
b_1, b_2, b_3 are parameters,
U is the error term.

A second set of questions was also to put to the women in order to gauge the extent to which women participated in decision-making both within the domestic sphere, as well as in agricultural activities. These questions were as follows:

1. Who made decision regarding selection of seed/crop varieties and quantity of seed to sow per unit of land during *kharif* and *rabi* seasons?,
2. Who made decisions on what to purchase, how much to purchase and where to purchase chemical fertilisers for the cultivation of different crops?,
3. Who made decisions on what, how much and where to purchase plant protection chemicals and also how much to spend on them?,
4. Who made decisions on whether to take up interculture, if so, how many times and when?,
5. Who made decisions on how much to sell, where to sell, to whom to sell the crop product(s) and when?,
6. Who made decisions on dairying issues, such as, animal care (feeding, grazing, cleaning, etc.), purchase and sale of animals, milking and sale of milk?,
7. Who made decisions regarding household chores, food items and clothes?

The responses to these questions were tabulated in terms of percentages.

RESULTS AND DISCUSSION

Employment of Women in Farm Activities

The summary statistics relating to labour utilisation in agricultural activities in the three villages are given in Table 1. First it is to be noted that the percentage of women who reported working at agricultural activities is high in all three villages, at over 80 per cent in the high awareness and tribal villages, and over 70 per cent in the partial awareness Semara village.

In each case, women's labour contributions to crop cultivation exceeded that of men. Thus for example, in Khangura, women worked for 82 days per hectare, while their male counterparts worked only for 50 days. This is also the village with the highest labour use at 132 days per hectare. It is the least in the low awareness village (100 days per hectare). In all villages, women accounted for 60 per cent of the total labour use in crop production.

TABLE 1. SUMMARY STATISTICS OF LABOUR USE IN CROP PRODUCTION IN THE THREE SAMPLE VILLAGES

(*days per hectare*)

	Percentage of sample women participating in farm activities*	Family labour		Hired labour		Total	
		Male	Female	Male	Female	Male	Female
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Khangura (High awareness)	83 (82)	37	39	13	42	50	82
Belagaon (Low awareness)	89 (86)	40	53	2	5	42	58
Semara (Partial awareness)	70 (94)	41	50	8	25	49	75

Note: *Figures in parentheses are the total number of sample women.

Reliance on hired labour is the highest in the high-awareness village, and least in the low-awareness village. Thus, in Khangura, half of the female labour use in crop production was accounted for by hired labour. The corresponding percentage for male labour was about one-quarter. In contrast, in Belagaon, family labour provided over 90 per cent of the total labour requirement for both men and women.

Further evidence of the substantial labour contributions of women in all three villages is given in Table 2, which provides crop and gender specific labour use. Paddy and cotton are the most labour-intensive crops, in both cases; female labour use exceeds that of men. Labour utilisation in other crops is lower, but even here women's employment exceeds that of men.

Women's participation in agriculture tends to be specific to certain operations such as transplanting, weeding and harvesting. In Khangura (Table 2A) which has a high level of awareness, women performed the bulk of farm activities such as transplanting, weeding and harvesting in paddy and weeding and picking in castor, cotton and sunflower, as also in intercropping and mixed cropping systems such as pearl millet + pigeonpea, sorghum + pearl millet and sorghum + pearl millet + pigeonpea. In the tribal Belagaon village as well (Table 2B), women did much of the weeding and picking/harvesting operations in all the sole and mixed crop system while for paddy they dominated the transplanting activities as well. Similar operation-specificity of female employment was also noticed at Semara, the partial awareness village (Table 2C).

A word on the changes that appear to have occurred over time is also in order here. The introduction of cotton and sunflower to the Southern Bundelkhand region has resulted in cropping pattern shifts towards these crops, which in turn have increased labour demand, especially that of women. Further, there have been some changes in the gender composition of crop operations in the tribal village. In particular, where ploughing, interculturing, fodder/straw harvesting, bundling, heads-loading, etc. used to be undertaken exclusively by male workers, these are now increasingly being carried out by female workers as well.

TABLE 2. LABOUR USE BY CROP, OPERATION AND GENDER IN THE THREE SAMPLE VILLAGES

2A: KHANGURA (HIGH AWARENESS)

Sr. No.	Crop production operations	Castor		Cotton		Sunflower		Paddy		Pearl millet + pigeonpea		Sorghum + pearl millet		Sorghum + pearl millet + pigeonpea	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1.	Preparatory tillage and clearing the debris	7	3	15	5	10	5	14	5	8	-	8	5	8	5
2.	Sowing/transplantation	5	5	5	15	5	10	13	63	5	5	6	6	6	9
3.	Fertiliser application	2	-	5	-	5	-	5	-	-	-	3	-	3	-
4.	Interculture/weeding	6	18	17	25	8	22	3	25	3	12	8	16	5	25
5.	Plant protection measures	5	5	13	6	5	5	3	3	-	-	5	5	5	5
6.	Harvesting/picking	5	26	13	75	10	22	10	30	10	15	13	20	10	30
7.	Threshing and winnowing	10	10	-	-	12	13	10	20	5	7	6	10	6	15
8.	Irrigation	-	-	-	-	-	-	30	-	-	-	-	-	-	-
	Total days	40	67	68	126	55	77	88	145	31	39	49	62	43	89

2B. BELAGAON (LOW AWARENESS)

Sr. No.	Crop production operations	Castor		Cotton		Horsegram		Paddy		Pearl millet + pigeonpea	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1.	Preparatory tillage and clearing the debris	8	3	16	5	7	-	20	6	10	-
2.	Sowing/transplantation	6	6	6	16	5	5	16	54	6	6
3.	Fertiliser application	-	-	3	-	-	-	4	-	-	-
4.	Interculture/weeding	8	10	18	20	-	10	5	20	4	16
5.	Plant protection measures	3	3	16	10	-	-	3	3	-	-
6.	Harvesting/picking	5	24	12	60	4	7	12	22	11	16
7.	Threshing and winnowing	9	10	-	-	3	5	10	14	4	6
8.	Irrigation	-	-	-	-	-	-	37	-	-	-
	Total days	39	56	71	111	19	27	107	119	35	44

2C. SEMARA (PARTIAL AWARENESS)

Sr. No.	Crop production operations	Castor		Cotton		Paddy		Pearl millet + pigeonpea	
		Male	Female	Male	Female	Male	Female	Male	Female
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.	Preparatory tillage and clearing the debris	8	2	15	4	12	5	8	3
2.	Sowing/transplantation	6	6	6	12	10	56	5	5
3.	Fertiliser application	2	-	2	-	3	-	3	-
4.	Interculture/weeding	7	16	15	21	3	20	3	16
5.	Plant protection measures	4	4	15	12	3	3	-	-
6.	Harvesting/picking	6	25	16	56	9	22	13	21
7.	Threshing and winnowing	9	12	-	-	8	15	5	10
8.	Irrigation	-	-	-	-	25	-	-	-
	Total days	42	65	69	105	73	121	37	55

Allocation of Time on Farm and Other Activities

Table 3 provides the daily time allocation pattern of men and women workers in the sample. As expected, women spend far greater time in domestic chores than do men, a feature common to all three villages. Also note that in the high-awareness Khangura village, both men and women spend longer hours in agricultural activities in a day which are about the same for men and women, except in the tribal area of Belagaon, where women spend more hours on the farm than men (a difference that is statistically significant). This may be attributed to the gender specificity of many operations such as transplanting, weeding and harvesting in the cultivation of cotton, horse gram and paddy crops. Indeed, in this village, women work longer hours than men in most activities.

TABLE 3. TIME ALLOCATION PATTERN OF MEN AND WOMEN WORKERS IN SAMPLE VILLAGES

	Khangura (high awareness)			Belagaon (low awareness)			Semara (partial awareness)		
Activity (1)	Male (2)	Female (3)	t-value (4)	Male (5)	Female (6)	t-value (7)	Male (8)	Female (9)	t-value (10)
Domestic	2.30	4.13	16.8199***	3.25	4.35	7.9080***	2.79	4.54	9.7602***
Animals	2.18	1.40	9.2968***	1.62	1.58	0.4435^{NS}	1.67	1.05	8.7819***
Agriculture	7.20	7.17	0.2471^{NS}	4.29	5.56	14.2377***	4.17	4.26	0.9836^{NS}
Non-agriculture	1.23	1.20	0.0365^{NS}	0.38	0.31	0.7991^{NS}	2.19	1.17	14.4068***

Note: t-value corresponding to a test of significance of difference in means, *, **, *** significant at 20, 10, 5 and 1 per cent level, respectively; NS= Not significant.

It is interesting to note that the tending of livestock is not the exclusive domain of women; men also play an important role in the care of animals. In fact, in all three villages, men seem to spend a greater amount of time than do women in the care of animals, and in non-agricultural activities, but the differences are not always statistically significant. Though livestock continues to be a secondary occupation, it is becoming an important source of income in the three selected villages irrespective of the level of extension outreach.

If the time spent on all activities is taken together, women appear to have equal or longer working hours than men, a result driven entirely by the number of hours spent in domestic chores. This is consistent with the results found in other studies: see for example Rajula Devi (1992).

A cross-tabulation of the number of hours worked in a day in agricultural activities by size of land holding (Table 4) suggests that the number of hours worked per day depends on the size class of land holding, although the hours worked by men and women in large sized farms in somewhat lower than in smaller farms in the tribal village. Further, the insignificant difference between male and female labour time on farm activities in Khangura and Semara is corroborated in each size category, as is

significantly higher labour time spent in agriculture by women as compared to men in Belagaon. It should be noted that these results are not directly comparable with studies that find evidence of a negative correlation between female employment in agriculture and land holding size, for our data refer to the number of hours worked per day.

TABLE 4. TIME SPENT BY MEN AND WOMEN WORKERS IN FARM ACTIVITIES BY SIZE CLASS OF HOLDING

(hours/day)

Operational farm size category	Khangura (high awareness)			Belagaon (low awareness)			Semara (partial awareness)		
	Male	Female	t-value	Male	Female	t-value	Male	Female	t-value
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Marginal	7.4	7.3	0.5479^{NS}	4.5	5.9	9.6352***	4.1	4.4	2.0121*
Small	7.5	7.8	1.6216$^{@}$	4.4	5.9	9.0361***	4.5	4.7	1.1581^{NS}
Medium	6.6	6.4	1.0178^{NS}	4.3	5.5	6.9164***	3.8	4.0	1.6722$^{@}$
Large	7.3	7.2	0.6297^{NS}	4.0	5.0	23.8095***	4.3	3.9	2.7913
Overall	7.2	7.2	0.2471^{NS}	4.3	5.6	14.6067***	4.2	4.3	1.0929^{NS}

Note: t-value corresponding to a test of significance of difference in means, @, *, **, and *** Significant at 20, 10, 5 and 1per cent level, respectively; NS = Not significant.

Gender Disparities in Wages

Table 5 presents information for wages by gender in each of the three villages. Gender disparities in wages are quite marked in all the sample villages, with female wages being 70 per cent of the male wage rates in Khangura, and as little as 50 per cent of male wages in Belagaon. These disparities arise in large part from the gender-based specialisation of specific farm operations. For example, farm operations like sowing, transplanting and weeding which carry lower wages are largely the responsibility of female workers while operations such as, ploughing, blade harrowing, interculturing and also post-harvest operations with relatively higher wages are generally performed by male workers.

TABLE 5. MONEY WAGE RATES OF MALE AND FEMALE AGRICULTURAL WORKERS

Villages	Money wages (Rs./hour)	
	Male	Female
(1)	(2)	(3)
Khangura (High Awareness)	3.75	2.57
Belagaon (Low Awareness)	3.75	1.88
Semara (Partial Awareness)	3.75	2.14

Interestingly, the observation that gender discrimination tends to be lower in tribal societies is not borne out in our study: in fact, wage differentials are the highest in tribal Belagaon. It is also in this village that women work longer hours in

agriculture than men, thus compounding the extent of discrimination. Also, male wage rates do not vary by village, while female wage rates do. The differential is negatively correlated with awareness levels; thus differentials are the least in the high-awareness Khangura, and highest in the low-awareness Belagaon. That wage differentials are lower in Khangura is attributable both to the higher demand for female labour (especially during peak times such as transplanting and harvesting) and also to the better awareness of women in workers about the new dry land farming technology as compared to other villages, which has translated into greater bargaining ability on the part of women in Khangura, and to a certain extent in Semara. There is very little mechanisation of crop operations in the selected villages. Thus mechanisation has had no role to play either in labour use patterns or on wages.

There are indications that money wages are increasingly popular in all three villages. Three-fourths of the hired labour is contracted on daily wages. The increased popularity of contract farming may be attributed to the perception that it enhances the bargaining power of workers; employers prefer it, as it appears to improve labour productivity and lowers monitoring costs.

Contract farming is being undertaken in various forms: all-women teams are used for transplantation and weeding, all-men teams for intra-field bund construction, making water channels, etc. in the case of irrigated paddy (all-men teams are rare for rainfed crops), and mixed teams for operations such as harvesting and threshing and winnowing.

It is interesting to note that equivalence units between male and female labour are not employed in joint piece rate contracts. The per unit wage is the same for men and women, and wages are distributed to members of the team in proportion to the quantum of work done. Indeed, if contract farming continues to increase in significance, it is likely that there will be further narrowing of gender-based wage differentials.

Labour Productivity

Table 6 provides information on output per worker to examine whether money wages rates are correlated with productivity. The (overall) output per worker in current prices works out to be the highest (Rs. 20,591) at high-awareness Khangura, more than five times the lowest figure (Rs. 3,744) reported from the tribal village and about four times that registered at Semara Villages (Rs. 5,223) under the partial awareness. The higher value of output per worker reported from the respondents at Khangura is largely on account of the preponderance of high value crops in the cropping pattern, higher productivity levels of crops under cultivation, and higher economic returns accruing to higher skills and better awareness of agricultural workers about the new dryland farming technologies as compared to the other two villages.

TABLE 6. OUTPUT PER WORKER UNDER DIFFERENT AWARENESS SITUATIONS

Cropping system crop	Physical output (kg)	Total output (kg)	Output per worker** (kg)	
(1)	(2)	(3)	(4)	(5)
KHANGURA (NO. OF SAMPLE WORKERS: 135)				
Sole crop				
Rice	124,415	124,415	922	3,965
Castor	39,233	39,233	291	2,997
Sunflower	30,764	30,764	228	2,599
Cotton	29,936	29,936	222	4,218
Intercropping				
Pearlmillet+pigeonpea	25,919+4,101	38,114	282	1,072
Pearlmillet+sorghum	32,654+22,142	55,087	428	1,550
Castor+pigeonpea	21,900+230	24,467	181	1,864
Mixed cropping				
Pearlmillet+sorghum	10,665+34,291	82,682	612	2,326
pigeonpea	12,535			
Total				20,591
BELAGAON (NO. OF SAMPLE WORKERS: 149)				
Sole crop				
Rice	12,180	12,180	82	353
Castor	24,512	24,512	165	1,700
Cotton	6,001	6,001	40	760
Horsegram	570	570	4	15
Intercropping				
Pearlmillet+pigeonpea	23,325+4,246	35,951	241	916
Total				3,744
SEMARA (NO. OF SAMPLE WORKERS: 148)				
Sole crop				
Rice	15,876	15,876	107	460
Castor	27,408	27,408	185	1,906
Cotton	15,790	15,790	107	2,033
Intercropping				
Sorglum+pigeonpea	17,195+4,954	31,735	214	824
Total				5,223

To correlate output per worker with the wage rate, we have also attempted to estimate a production function for the cotton and castor crops in each of the three villages. The functional form used is the Cobb-Douglas, and the estimated coefficients are set out in Table 7. The estimates are not well determined, and indicate either insignificant or perverse coefficients for the labour input in many instances. Thus for instance the coefficient of male labour is insignificant in four of the six cases, and that of female labour is negative and significant in three cases and insignificant in two. There are of course well-known econometric problems associated with such estimation which probably explain these puzzling results. A more systematic estimation of the marginal productivity of labour is beyond scope of this paper; suffice it to note that the production function analysis does not help to shed light on the wage differentials observed in the three villages.

TABLE 7. PRODUCTION FUNCTION ESTIMATES FOR COTTON AND CASTOR CROPS

Crop (1)	Situation (2)	No. of observations (n) (3)	Constant (a) (4)	Regression coefficients of: Area (X_1) (5)	Male labour (X_2) (6)	Female labour (X_3) (7)	R^2 (8)
Cotton	Khangura	13	11.9950***	-1.3840^{NS}	0.0110^{NS}	-0.0201**	0.6640
			(1.2104)	(0.7864)	(0.0111)	(0.0081)	
	Belagaon	11	3.2130**	2.6850**	-0.0254^{NS}	0.0210^{NS}	0.6700
			(1.0639)	(0.9227)	(2.8483)	(2.5585)	
	Semara	26	4.8635***	0.4450^{NS}	0.0706***	-0.0441***	0.6250
			(0.5825)	(0.6953)	(0.0122)	(0.0087)	
Castor	Khangura	15	5.555***	0.2994^{NS}	0.0318***	0.0014^{NS}	0.6200
			(0.4606)	(51.6207)	(0.0105)	(0.5311)	
	Belagaon	27	5.7070***	0.3362**	-0.0068^{NS}	-0.0143***	0.6940
			(0.1785)	(0.1425)	(0.4147)	(0.0042)	
	Semara	36	5.0142***	-1.2554**	-0.0117^{NS}	0.0286***	0.3500
			(0.5386)	(0.365)	(0.0119)	(0.0069)	

Note: Figures in parentheses indicate standard errors of regression coefficients *, ** and *** Significant at 10, 5 and 1 per cent level. NS- Not significant.

Women's Participation in Decision-Making

Table 8 presents information on women's participation in decision-making in a wide array of issues. It is interesting to note that the major decisions regarding selection of crop seed and variety, fertiliser use, sale of produce, dairying, etc. were taken by both men and women together with mutual consultation; decision taken by both was the nodal response for issues relating to crop production in both the high-awareness Toorpupalli and in tribal Mangalithanda. In the partial awareness village, men tends to have somewhat a greater say in crop production decision. In the case

TABLE 8. DECISION-MAKING BEHAVIOUR IN SAMPLE HOUSEHOLDS

Particulars of issues (1)	(Per cent of decisions taken by) Khangura (high awareness) Female (2)	Male (3)	Both (4)	Khangura (low awareness) Female (5)	Male (6)	Both (7)	Semara (partial awareness) Female (8)	Male (9)	Both (10)
Crop production issues									
Seed	15	33	52	10	31	59	19	33	48
Fertiliser use	-	50	50	8	42	50	19	40	41
Use of pesticides	-	54	46	8	44	48	6	65	29
Interculture	25	6	69	13	19	68	8	65	27
Marketing of produce	4	31	65	10	19	71	6	48	46
Dairying issues	7	17	76	27	27	46	20	10	70
Domestic issues									
Routine	63	6	31	90	-	10	62	-	38
Food items	69	2	29	83	-	17	65	-	35
Cloths	4	4	92	14	19	67	10	15	75

of dairying, once again, most decisions are jointly made by men and women. It is only 'routine domestic decisions, and in 'food items' that are taken largely by women in all three villages. In fact in only a small minority of sample households did men report taking unilateral decisions on domestic concerns relating to routine chores. If one compares across the two non-tribal villages, it is clear that women are much more involved in crop-production decisions in Toorpupalli than in Tandra. This is suggestive of better awareness in itself translating into greater say for women in decision-making.

CONCLUSIONS AND POLICY IMPLICATIONS

The results of the study suggest that while technologies meant for dry land areas have made a significant impact on productivity and output, their impact on labour demand and wages is not insignificant either. Women account for bulk of the labour used in the crops cultivated in the three sample villages. Many crop operations continue to be characterised by gender-based specialisation which in turn has translated into lower wages for women. A comparison of the overall number of hours worked by men and women suggests that while these vary across villages within a village there are no male female differences. Thus women are paid less than men, even though the length of their working day is comparable to that of men. Nevertheless, there are signs that changes are taking place, there is some evidence that the kisan melas and other extension efforts not only bring about increased awareness of technological management options, but also may have played a role in narrowing gender differentials in wages, both directly as well as indirectly by influencing the demand and contractual arrangements for labour. Thus the male female wage differential is the least in the high-awareness village of Toorpupalli. It is to be noted, however, that across village, differences in wages are not commensurate with differences in the average product of labour, and our attempts to relate male and female wages in each village to the marginal product of labour (through the Cobb-Douglas production function) were unsuccessful.

That men and women typically take decisions jointly regarding crop activities, both in the tribal village, as well as in the high-awareness village, but not in the low awareness village suggests that extension efforts can and do reach out to women, in spheres that extend beyond the imparting of technical know-how. This implies that if extension efforts were to reach villages such as Semara, perhaps intensive training programmes at village Panchayat level through a Farmers Training Centre, there could not only be an employment effect, but knowledge may well translate into empowerment. And this, surely, is the key to better livelihoods for all, and for women in particular.