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CHANGING PATTERNS OF LABOUR ABSORPTION ON
AGRICULTURAL FARMS IN EASTERN UTTAR PRADESH
(A CASE STUDY)

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Modern technology in agriculture encompasses the use of high-yielding seeds, balanced fertilizers, farm machinery and scientific managerial approach. The green revolution in agriculture introduced in 1966-67 reached its peak in 1972-73, showing the highest rate of production and highest absorption of farm labour per hectare. It seems that after 1972-73 the fertilizer use in agriculture continued to increase but the rate of labour use declined. Several studies made in Punjab and other States have shown a continued increase in labour use with the introduction of high-yielding varieties (HYVs) but available evidence from east Uttar Pradesh does not support this conclusion.

OBJECTIVES AND METHODOLOGY

The present study makes an attempt (1) to examine the changes in the level of use of inputs in the selected crops, (2) to analyse the extent of labour use (over time) and employment of male-female labour in different agricultural operations under selected crop technologies, (3) to analyse the rate of returns per unit of labour under the crop technologies, and (4) to study the effect of the size of holdings on labour absorption.

The study is based on an intensive enquiry of a sample of 100 farmers selected on stratified random sampling basis, adopting new farm technology from the villages of Sikrara block of district Jaunpur (Uttar Pradesh), conducted in 1967-68, 1972-73 and 1979-80 by the Department of Agricultural Economics, C. S. Azad University of Agriculture and Technology, Kanpur. The farmers were categorised into 0-1, 1-2, 2-3 and more than 3 hectares of holdings and their number was kept in proportion to their number falling in each size-group in the universe of ten villages. The study was conducted by survey method at three points of time covering the same sample size of farmers.

FINDINGS

Economic Structure of Farm Respondents

The average size of farms, cultivated area and its distribution on different size-groups of holdings are given in Table I.

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TABLE I—AVERAGE SIZE OF FARMS AND DISTRIBUTION OF CULTIVATED AREA

Size-group (ha.)	No. of farm holdings	Average size of farm (ha.)	Total cultivated area (ha.)	Percentage of total cultivated area
0-1	36	0.48	17.28	9.72
1-2	30	1.50	45.00	25.32
2-3	20	2.40	48.00	27.00
3 and above	14	4.82	67.48	37.96
Total	100	1.78	177.76	100.00

It is evident from Table I that the average size of sample holdings was 1.78 hectare. Further, the smaller the size of holdings, the larger was the proportion of farmers in the total sample. Thirty-six per cent of farmers had an average size of 0.48 hectare of holdings each, whereas 14 per cent of them possessed an average size of 4.82 hectares of holdings each.

The use of input factors under various adopted technologies is given in Table II.

TABLE II—TECHNOLOGICAL CHANGE AND INPUT USE

Inputs	Maize			Paddy			Potato			Wheat		
	1967- 68	1972- 73	1979- 80	1967- 68	1972- 73	1979- 80	1967- 68	1972- 73	1979- 80	1967- 68	1972- 73	1979- 80
Human labour (days)	91	110	86	88	106	83	188	223	189	87	104	98
Bullock labour (days)	7	14	11	13	24	18	19	26	23	30	36	38
Seed (kg./ha.)	15	20	20	35	37	38	18	20	22	75	100	100
Fertilizer N ₂ (kg./ha.)	45	53	76	51	62	73	97	112	132	60	73	93
Irrigation (No.)	1	1	1	2	3	3	5	6	6	3	4	4

As may be noted from Table II, human and bullock labour utilization as well as the use of all inputs of production except fertilizer reached the highest level in 1972-73. The use of human and bullock labour tended to decline thereafter. It is interesting to note that the seed rate which appears to be a fixed factor showed an increase in 1972-73 as compared to the year

1967-68 and it remained the same in 1979-80 for maize and wheat as in 1972-73. However, the seed rate in potato and paddy showed a continuous increase from 1967-68 to 1979-80. The fertilizer use has shown a continuous increase which seems to be very significant. The number of irrigations per hectare also increased in the case of paddy, potato and wheat. It appears that no new dimension has been added in technology after 1972-73 to further augment labour absorption in agriculture.

The results of the operationwise employment of human labour in various crops under the adopted technologies are given in Table III.

TABLE III—OPERATIONWISE EMPLOYMENT OF HUMAN LABOUR IN INDIVIDUAL CROPS UNDER IMPROVED TECHNOLOGY

(man-days)

Practices	Maize			Paddy			Potato			Wheat		
	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80
Land preparation	6	8	8	10	15	12	18	20	18	20	24	20
Sowing/planting	4	4	4	21	24	22	20	20	20	6	6	6
Fertilizer use ..	7	9	6	11	14	14	8	8	6	3	4	5
Irrigation ..	2	2	2	2	3	3	28	37	31	5	6	6
Plant protection measures ..	—	—	—	—	3	2	—	—	—	—	2	2
Interculture ..	29	20	11	28	23	9	76	81	71	23	17	11
Harvesting and threshing ..	43	67	55	16	24	20	38	55	43	30	45	48
Total ..	91	110	86	88	106	83	188	223	189	87	104	98

Table III reveals that the labour days utilized for land preparation, sowing/planting, fertilizer use and irrigation in various crops varied very little at the three points of time. It is significant that in inter-cultural operations the labour requirement in the crops studied increased from 1967-68 to 1972-73 and declined abruptly in 1979-80. The same trend is visible in the case of harvesting and threshing operations excepting in wheat where the labour requirement in harvesting and threshing continued to increase. It appears that human labour has been substituted by other inputs like higher use of fertilizers to maintain the productivity at the previous level.

The study analysed the employment of male and female labour in different farm operations in the selected crops and the results are given in Table IV.

TABLE IV—EMPLOYMENT OF MALE-FEMALE LABOUR IN DIFFERENT OPERATIONS OF CULTIVATION

(days/hectare)

Crop operations	Maize			Paddy			Potato			Wheat		
	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80
Land preparation												
Male ..	6	8	8	10	15	12	15	14	11	20	20	18
Female ..	0	0	0	0	0	0	3	6	7	0	4	2
Sowing/planting												
Male ..	2	2	2	4	8	10	12	16	10	3	3	3
Female ..	2	2	2	17	16	12	8	4	10	3	3	3
Fertilizer use/ manuring												
Male ..	7	7	6	11	11	11	7	8	6	2	3	4
Female ..	0	2	0	0	3	3	1	0	0	1	1	1
Irrigation												
Male ..	2	2	2	2	2	2	20	26	23	5	5	6
Female ..	0	0	0	0	1	1	8	13	8	0	1	0
Plant protection												
Male ..	0	0	0	0	2	2	0	0	0	0	2	2
Female ..	0	0	0	0	1	1	0	0	0	0	0	0
Interculture												
Male ..	7	4	3	7	9	1	25	35	35	9	7	7
Female ..	22	16	8	21	14	8	50	46	36	14	10	4
Harvesting and threshing												
Male ..	12	20	25	4	7	6	18	30	21	7	18	28
Female ..	31	47	25	12	17	14	20	25	22	23	27	20
Total												
Male ..	36	43	46	38	54	44	98	129	106	46	58	68
Female ..	55	67	40	50	52	39	90	94	83	41	46	30

Table IV shows that the overall employment of male labour has increased from 1967-68 to 1979-80 in all the crop technologies but on the other hand, the employment of female labour reached the peak in 1972-73 and declined thereafter, which indicates that after 1972-73 female labour, which was primarily engaged in interculture, and to some extent in harvesting and threshing, has been substituted either by male labour or by other input to keep the productivity at its previous level. Thus this phenomenon of displacement of female labour by agricultural technology may aggravate social inequality.

The returns to per unit of labour per unit of land have been estimated for different crops at the three points of time and presented in Table V.

TABLE V—PER UNIT COST AND RETURNS FROM HUMAN LABOUR

Crops	1967-68			1972-73			1979-80		
	Per unit cost of labour (Rs.)	Gross returns (Rs./day)	Net returns (Rs./day)	Per unit cost of labour (Rs.)	Gross returns (Rs./day)	Net returns (Rs./day)	Per unit cost of labour (Rs.)	Gross returns (Rs./day)	Net returns (Rs./day)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Maize	1.60	6.22	4.62	4.00	8.33	4.33	6.50	10.73	4.23
Paddy	1.60	7.07	5.47	4.00	9.89	5.89	6.50	11.93	5.43
Potato	1.60	16.08	14.48	4.00	15.21	11.21	6.50	17.94	11.44
Wheat	1.60	8.87	7.27	4.00	9.73	5.73	6.50	12.58	6.08

Table V shows that the labour rate has gone up from Rs. 1.60 in 1967-68 to Rs. 6.50 in 1979-80 with a corresponding increase in the returns to per unit of labour from Rs. 6.22 to Rs. 10.73. It may however be noted that the proportionate contribution attributed to one unit of labour over this period (1967-80) has remained the same for maize and paddy. It indicates that labour efficiency has not improved due to new technologies of these crops. However, in the case of potato and wheat the contribution of a unit of labour in net returns has shown a decline. It appears that a slight fall in the labour use in wheat has been nullified by increased cost of labour.

The results of the analysis of labour use according to the size of holdings are given in Table VI.

TABLE VI—HUMAN LABOUR USE ACCORDING TO THE SIZE OF HOLDINGS

Size-group of farms (ha.)	<i>(days/hectare)</i>											
	Maize			Paddy			Potato			Wheat		
	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80	1967-68	1972-73	1979-80
0-1	84	90	78	88	99	80	170	200	190	80	100	92
1-2	93	115	89	90	109	85	193	236	195	85	105	100
2-3	104	124	102	94	114	90	201	241	201	95	108	102
3 and above ..	83	110	75	80	102	77	188	215	170	88	103	98
Overall ..	91	110	86	88	106	83	188	223	189	87	104	98

From Table VI it is clear that in all the crop technologies, irrespective of the size of farms, human labour utilization has shown an increase from 1967-68 to 1972-73 but it declined in 1979-80. However, the labour use increased with an increase in the size of holdings upto 2-3 hectares and it decreased with an increase in the size of holdings under all the crop technologies. It clearly indicates that farmers with holdings of more than three hectares substituted labour by other inputs.

CONCLUSION AND POLICY IMPLICATIONS

The findings of the study lead to the conclusion that farm labour employment has been generated upto 1972-73 as a result of adoption of modern technologies in agriculture but afterwards it declined. Labour has been substituted by the higher rate of use of fertilizer and irrigation inputs. Inter-culture and harvesting/threshing operations were found to be increasingly displacing the human labour in general and female labour in particular. The employment of male labour increased over time but that of female labour declined abruptly after 1972-73. The labour rates have gone up during the period selected for study with a corresponding increase in the returns to per unit of labour. In the light of above findings, it may be suggested that technologies need to be perfected and made more remunerative so that more labour employment opportunities may be generated. Special attempts for employment of farm women need to be made.