Agricultural Economics Research Review
Vol. 24 (Conference Number) 2011 pp 373-380

Labour Scarcity – Its Immensity and Impact on Agriculture

C. Prabakar[a]*, K. Sita Devi[a] and S. Selvam[b]
[a]Department of Agricultural Economics, Annamalai University, Annamalai Nagar-608 002, Tamil Nadu
[b]Department of Agricultural Economics, Anbil Dharmalingam Agricultural College and Research Institute, Tamil Nadu Agricultural University, Trichy-622 073, Tamil Nadu

Abstract

The labour scarcity being felt as a major impediment in agriculture, this study has probed into its magnitude, impacts, causes and possible solutions in the Cuddalore district of Tamil Nadu. The study has revealed that prevalence of acute labour scarcity in the district has affected the productivity levels of almost all crops and is even leading towards the permanent changes in the cropping pattern. The important reasons identified for the labour scarcity include higher wages in other locally-available jobs, seasonal nature of agricultural jobs and presumption of an agricultural job to be of low esteem. The level of adoption of labour-saving implements and technologies by the farmers is very low for the reasons of higher cost, lack of skill and smaller size of holdings. The study has suggested that agricultural extension system of the district / state / country should be geared-up, to bring out farmers from the conventional methods of cultivation and to educate them on adoption of labour-saving implements and technologies. Also, a community level approach should be encouraged among farmers for adopting / availing highly expensive labour-saving technologies and implements cooperatively. In addition, agricultural jobs should be made more remunerative by increasing the wages at least at par with other jobs available locally.

Key words: Labour scarcity, Labour-saving technologies, Supply-demand of agricultural labour

JEL Classification: J43

Introduction

Even though India has the second largest man power in the world, all sectors of the economy have been affected by the scarcity of labour, the impact being felt more in the agricultural sector. Labourers constitute a vital input in agricultural production, but they are migrating to different parts of the country for earning a better livelihood, adding to the existing imbalance between labour demand and supply of labourers (Deshingkar, 2003). The 2001 Census of India defined agricultural labour as any person who worked on another person's land only as labourer, without exercising any supervision in cultivation, for wage in cash or share such as share of produce (GoI, 2001). The portion of agricultural workers to the total workers has been declining over the years, while the corresponding ratio in the secondary and tertiary sectors is on the rise. Pursuant to this, following impacts have been predominantly noticed in agriculture in recent years: reduction in crop yield, reduction in cropping intensity and changes in traditional cropping pattern. Though agricultural research has evolved-in many crop-specific, labour-saving implements and technologies, the problem has not been addressed fully. Another matter of concern is that in the sociological perspective, the vocation of casual agricultural labour is considered to be the last resort and hence preferred only by people who have no other means of livelihood.

The situation being more complex and unmanageable, it was perceived to undertake a study,

* Author for correspondence,
Email: prabakaragri@yahoo.co.in

§ This study was undertaken by the authors, exclusively to make a presentation in 19th AERA conference, after conceiving the focal theme suggested in the previous conference at Hydrabad.

probing into the socio-economic perspectives of labour scarcity, its root causes and possible solutions. The causes of labour scarcity and alternative solutions being region-specific, the study was restricted to the Cuddalore district, where labour scarcity is being felt as a persistent disturbance by most of the farmers. The objectives of the study were:

- To ascertain the supply-demand gap of the agricultural labourers in the Cuddalore district of Tamil Nadu,
- To assess the influence of labour scarcity on the cropping pattern in the district,
- To assess the impact of labour scarcity and non-adoption of labour-saving technologies in agriculture, and
- To identify the reasons for labour scarcity and non-adoption of labour-saving technologies in agriculture.

Methodology

Sampling Procedure

The study was undertaken in the Cuddalore district of Tamil Nadu in the year 2010-11 and the primary data collected pertained to the previous year. The stratified random sampling technique was used for the selection of respondent farmers and agricultural labourers. Since Cuddalore district has six taluks (Cuddalore, Chidambaram, Vridhachalam, Panruti, Kattumannarkovil and Tittakudi), six villages were selected for the study, one from each taluk. The village with highest net area under cultivation was selected purposively from each taluk. The sample size was restricted to 300 farmers and 60 agricultural labourers @ 50 farmers and 10 agricultural labourers from each village. The sample farmers were post-stratified crop-wise, viz. paddy, sugarcane, groundnut, pulses and cotton and were further categorized into labour-scarcity-affected and non-affected farmers and labour-saving technology-adopted and non-adopted farmers, respectively, for each crop to carry out the analyses.

Database

The primary data related to demand for agricultural labour, productivity of different crops in labour-scarcity-affected and unaffected farms and labour-saving technology-adopted and non-adopted farms, reasons for labour scarcity and reasons for non-adoption of labour-saving technologies were obtained from the farmer respondents. The primary data related to the average mandays of work delivered per month by the agricultural labourers were obtained from the sample agricultural labourers.

The information related to available agricultural labourer population in the district, cropping pattern and crop-wise area coverage in the past ten years (2000-01 to 2009-10) was obtained from the secondary sources, viz., Office of the Assistant Director of Agriculture, District Statistics Office in Cuddalore District.

Analytical Strategies / Tools

The analytical strategies / tools used in the study were: (i) Supply-demand gap analysis, (ii) Markov chain analysis, (iii) Productivity gap analysis, and (iv) Garrett ranking technique.

Supply – Demand Gap Analysis

The month-wise supply of labour was assessed by considering the available agricultural labour force in the district (secondary data) and average mandays of work delivered in a month by each labour (primary data).

The month-wise demand for labour was assessed by considering the area under each crop and labour requirement for various cultural operations to be carried out in each month (Appendix – II). Estimates were obtained by availing both primary and secondary data.

Markov Chain Analysis

The structural changes in the cropping pattern due to labour scarcity were examined by using the Markov chain approach.

Productivity Gap Analysis

The unpaired t-test was employed to assess the statistical significance of the difference in the mean productivity levels of labour-scarcity-affected and unaffected farms and labour-saving technology-adopted and non-adopted farms, respectively.

Assumptions made for classifying labour-scarcity-affected and unaffected farms and labour-saving

technology-adopted and non-adopted farms are given below:

- The farms wherein there was a cumulative delay of 10 days or more in carrying out any one or more of the agricultural operations in the previous season were categorized as labour-scarcity affected farms.
- The farms wherein at least one of the labour-saving-technologies / implements listed in Appendix-I, if adopted, were categorized as labour-saving technology-adopted farms.

Garrett Ranking Technique

Garrett ranking technique (Garrett and Woodworth, 1971) was used to rank the reasons for labour scarcity and reasons for non-adoption of labour-saving technologies.

Results and Discussion

Supply-Demand Gap of Agricultural Labour

The estimated demand for agricultural labour in the Cuddalore district has been found highest during the months of September (24,77,786 persondays) and December (23,55,307 persondays), followed by November, June, August and January (Table 1). The available labour population was employed on an average for twenty persondays in a month, and considering the total agricultural labour population of the district as 72,510, the supply of labour was worked out to be 14,50,200 persondays per month. A perusal of Table 1 reveals that the labour demand exceeded labour supply during seven months, viz. January, June, July, August, September, November and December. It is to be noted that the total monthly labour demand during the months of September and December was approximately double the labour supply, which vividly expresses the gravity of labour scarcity prevailing in the Cuddalore district.

Markov Chain Analysis on the Changes in Cropping Pattern

The prevailing acute labour scarcity might have impacts on the cropping pattern of the district in the long-run. It is therefore imperative to probe into the type of transition that has taken place / would take place in future. The study has revealed that the probability of retaining paddy, the principal food crop, is only 37 per cent, whereas the probability of retaining cashew is 75 per cent and of coconut is 67 per cent. The probability of retention is higher of cashew and coconut, followed by sugarcane and paddy. It may, therefore, be inferred that a change in cropping pattern is already visible and the transition trend is towards the cultivation of crops which are less labour-intensive, like tree crops. The analysis has further revealed that if this trend continues then of the total cropped area, around 32 per cent will be under cashew and 21 per cent under coconut — the tree crops. Sugarcane and paddy will occupy 18 per cent and 14 per cent, respectively (Table 2).

Productivity Gap Analysis

Productivity Levels of Labour-Scarcity Affected and Unaffected Farms

On comparing the average productivity levels of different crops in the Cuddalore district, it was revealed that there was yield reduction, invariably in all crops in labour-scarcity-affected farms. The productivity difference was more pronounced in cotton (14.5%) and paddy (11.8%) crops (Table 3).

The 'unpaired t-test' employed to confirm the productivity levels in the two groups, viz. labour-scarcity-affected and unaffected farms, has revealed a significant difference statistically. The study has observed a significant difference in the average productivity between the labour-scarcity-affected and unaffected farms, except for pulses, for which it was insignificant (Table 4). The impact of labour scarcity is felt less in the pulse crops, since their cultivation require less labour than by other crops. Moreover, the major cultural operations, viz. weeding and harvesting of pulse crops fall in the months of March and April which are virtually considered off-season months in agriculture.

Productivity Levels of Labour Saving Technology Adopted and Non-Adopted Farms

A comparison of the average productivity levels of different crops in labour-saving technology-adopted and non-adopted farms, revealed a reduction in yield invariably in all the crops in labour-saving technology non-adopted farms. The productivity difference was more pronounced in cotton (18.4%), groundnut (15.1%) and paddy (12.6%) crops (Table 5).

Table 1. Month-wise agricultural labour supply-demand for principal crops in Cuddalore district

(persondays)

Crop	Area (ha)	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Paddy (*Kuruvai*)	25, 426						15,76,412	11,95,022	11,95,022	12,71,300			
Paddy (*Samba*)	12,588	6,29,400								7,80,486	5,91,636	4,65,756	3,14,700
Paddy (*Thaladi*)	19,181	9,01,507	9,59,050									11,89,222	9,01,507
Sugarcane	10,992			5,49,600	54,960	5,49,600	1,97,856	4,06,074	2,74,800	2,74,800	54,960	2,74,800	8,24,400
Groundnut	5,299		2,64,950	2,38,455	2,38,455	3,28,538							
Cotton	3,024						96,768	1,11,888	1,60,272	1,51,200			
Pulses	19,171		95,855	5,17,607	9,58,550								
Demand		15,30,907	13,19,855	13,05,672	12,51,965	8,78,138	18,71,036	17,13,614	16,30,094	24,77,786	6,46,596	19,29,778	23,55,307
Supply							72,510* × 20** = 14,50,200						

Note: * Cuddalore district total agricultural labour population (2010)

** Mandays employed per month per labour

Table 2. Transition probability and steady state probability of changes in cropping pattern in Cuddalore district

Crop	Cotton	Sugarcane	Coconut	Groundnut	Paddy	Cashew	Pulses	Others
Cotton	**0.05**	0.14	0.28	0.06	0.16	0.24	0.03	0.04
Sugarcane	0.01	**0.46**	0.28	0.02	0.06	0.11	0.02	0.04
Coconut	0.04	0.07	**0.67**	0.01	0.04	0.09	0.03	0.05
Groundnut	0.03	0.19	0.18	**0.24**	0.15	0.17	0.01	0.03
Paddy	0.09	0.05	0.17	0.06	**0.37**	0.16	0.05	0.05
Cashew	0.03	0.03	0.09	0.02	0.04	**0.75**	0.03	0.01
Pulses	0.05	0.10	0.18	0.08	0.18	0.12	**0.23**	0.06
Others	0.01	0.19	0.10	0.10	0.10	0.17	0.08	**0.25**
Steady state probability	0.01	0.18	0.21	0.04	0.14	0.32	0.03	0.07

Table 3. Productivity levels of labour-scarcity-affected and unaffected farms

Crop	Productivity		Productivity difference (kg/ha)
	Labour-scarcity-unaffected farms (kg/ha)	Labour-scarcity-affected farms (kg/ha)	
Paddy	5,090	4,487	603 (11.8)
Sugarcane	1,53,292	1,44,165	9,127 (6.0)
Groundnut	3,767	3,592	175 (4.6)
Pulses	850	780	70 (8.2)
Cotton	1,410	1,205	205 (14.5)

Note: Figures within the parentheses represent the difference in per cent values with reference to unaffected farms.

Table 4. Results of unpaired t-test on the productivity levels of labour- scarcity-affected and unaffected farms

Crops	Labour-scarcity-unaffected farmers	Labour-scarcity-affected farmers	't'-test values
Paddy	21	55	3.14**
Sugarcane	20	26	2.21*
Groundnut	07	22	3.17**
Pulses	19	07	1.92
Cotton	21	07	3.05**

Note: * and ** denote significance at 5 per cent and 1 per cent levels, respectively.

The 'unpaired t-test' results have revealed a significant difference in the average productivity between the labour-saving technology-adopted and non-adopted farms in all the crops (Table 6). It implies that 'labour-saving technology-non-adopted' farms have borne the brunt of scarcity of labour more severely than the other category. The pulse crops were excluded from this analysis, since there is no noteworthy labour-saving technology or implement available for pulse crop, presently.

Reasons for Labour Scarcity

Among the various reasons quoted for labour scarcity in agriculture, the 'higher wages in other locally

Table 5. Productivity levels of labour-saving technology-adopted and non-adopted farms

Crop	Productivity		Productivity difference (kg/ha)
	Technology-adopted farms (kg/ha)	Technology non-adopted farms (kg/ha)	
Paddy	5,142	4,492	650 (12.6)
Sugarcane	1,53,675	1,44,680	8995 (5.9)
Groundnut	3,777	3,205	572 (15.1)
Cotton	1,437	1,172	265 (18.4)

Note: Figures within the parentheses denote difference in per cent values with reference to technology-adopted farms.

Table 6. Results of unpaired t-test on the productivity levels of labour - saving technology-adopted and non-adopted farms

Crop	Technology-adopted farmers	Technology-non-adopted farmers	't'-test values
Paddy	30	46	2.52*
Sugarcane	17	29	3.56**
Groundnut	09	20	3.86**
Cotton	09	19	2.63*

Note: * and ** denote significance at 5 per cent and 1 per cent levels, respectively.

available jobs' was ranked 'first' because the higher wage rate prevailing in the non-agricultural works like masionry, carpentry, electrical and plumbing works, which are locally available, attract the labourers.

The agricultural jobs being seasonal, the labourers remain unemployed during off-season period. This makes them to seek for a regular / permanent job that could provide them income throughout the year. This reason was ranked 'second'. Working as an agricultural labourer is considered as a low-esteem job in the rural areas and this reason was ranked 'third'. Out-migration due to improvement in educational status, migration to nearby town / city for higher wages and migration to foreign countries were ranked the fourth, fifth and sixth reasons, respectively (Table 7).

Table 7. Garrett ranking for the reasons for labour scarcity

Reason	Mean score	Rank
Higher wages in other jobs available locally	55.60	I
Shifting to a regular / permanent job since agricultural job is seasonal	52.03	II
Agriculture labouring is presumed to be a low-esteem job	49.56	III
Migration to nearby city for higher wages	48.46	IV
Migration due to improvement in educational status	47.43	V
Migration to foreign countries	47.30	VI

Reasons for Non-Adoption of Labour-saving Technologies

Among the various reasons listed for non-adoption of labour-saving technologies by the respondents, the higher cost involved in adoption of technology was ranked first, followed by lack of skill and smaller landholdings as second and third reasons. The complacent attitude of the farmer was ranked the fourth reason (Table 8).

Table 8. Garrett ranking for reasons for non-adoption of labour-saving technologies / implements

Reason	Mean score	Rank
Higher cost	53.62	I
Lack of skill	49.43	II
Smaller landholdings	45.30	III
Complacent attitude	41.51	IV
Hesitation for adoption due to fear of failure	40.03	V
Unawareness of technology	38.27	VI

Conclusions and Policy Implications

The study has revealed an acute labour-scarcity in the Cuddalore district for the agricultural works, affecting consequently the productivity levels of almost all the crops grown in the district. If this trend continues, the cropping pattern of the district may even get a shift towards tree crops like cashew and coconut, which are comparatively less labour-intensive. The reasons identified for the labour scarcity include higher wages in other locally available jobs, seasonal nature of agricultural job and presumption of an agricultural job as a low-esteem one.

The analyses have further revealed that the available labour-saving implements and technologies could have a positive impact on the productivity levels of crops, if adopted. The reasons identified for their non-adoption include higher cost, lack of skill and small size of holdings. The study has made following suggestions for improving the labour supply to the agricultural sector:

- The labour scarcity being inevitable in a fast developing economy, agricultural extension system of the district / state / country has to be geared up, to bring farmers out from the conventional methods of cultivation and educate them on adoption of available labour-saving implements / technologies.
- A community level approach is to be encouraged among farmers for adoption / availing of the highly expensive labour-saving technologies / implements.
- The agricultural job has to be made more remunerative by increasing the wages at par with other jobs available locally.

Acknowledgement

Authors are thankful to the referee for his suggestions to improve the presentation of the paper.

References

Deshingkar, P. and Start, D. (2003) *Seasonal Migration for Livelihoods, Coping, Accumulation and Exclusion.* Working Paper No. 220, Overseas Development Institute, London.

Garrett, Henry E. and Woodworth, R.S. (1971) *Statistics in Psychology and Education.* Vakils Feffer and Simon, Bombay.

GOI (Government of India) (2001) *Census of India 2001 – District Census Hand Book*. Directorate of Stationery and Printing, Chennai.

Appendix I

Labour-saving technologies / implements available for the selected crops

Crop	Labour-saving technology / implement
Paddy	i. Transplanter
	ii. Harvester
	iii. Cono weeder
Sugarcane	i. Planter
	ii. Mini tractor
	iii. Harvester
Cotton	i. Drip irrigation
	ii. Harvester
	iii. ULD Pesticides
Groundnut	i. Seed cum fertilizer drill
	ii. Micro irrigation

Appendix II

Month-wise agricultural operations and labour requirement for principal crops in the Cuddalore district

Month	Crop						
	Paddy (Kuruvai)	Paddy (Samba)	Paddy (Thaladi)	Sugarcane	Groundnut	Cotton	Pulses
Jan		Harvesting (50)	2nd weeding, irrigation (47)				
Feb			Harvesting (50)		Land preparation, sowing(50)		Broadcasting (5)
Mar				Land preparation (50)	1st weeding, fertilizer application (45)		Weeding (27)
Apr				Planting (5)	2nd weeding (45)		Harvesting (50)
May				1st weeding (50)	Harvesting (62)		
June	Nursery, main land preparation, transplanting (62)			Fertilizer application (18)		Land preparation, sowing(32)	
July	1st weeding, fertilizer application (47)			2nd weeding (37)		1st weeding, fertilizer application (37)	
Aug	2nd weeding, irrigation(47)			Earthing up (25)		2nd weeding, topping, irrigation(53)	
Sep	Harvesting (50)	Nursery, main land preparation, transplanting (62)		Detaslling (25)		Harvesting (50)	
Oct		1st weeding (47)		Fertilizer application (5)			
Nov		Fertilizer application (37)	Nursery, main land preparation, transplanting (62)	Detaslling (25)			
Dec		2nd weeding, irrigation (25)	1st weeding, fertilizer application (47)	Harvesting (75)			
Total	(206)	(251)	(206)	(305)	(202)	(172)	(82)

Note: Figures within the parentheses is labour requirement, persondays / ha