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come directly measures the farmer's paying capacity. Each of these variables was found to have a significantly positive relationship with the demand and the wage as expected showed a significantly negative relationship with it. All these variables taken together explained a very high percentage of the variation in the demand for labour among the districts.

On the supply side, the wage rate is expected to affect the supply of labour to an employment only when alternative opportunities are available. In our model, the relationship was not found to hold. Probably, the supply of labour in the rural sector is demographically and institutionally so determined and fixed as not to vary with the wage rate. The prevalence of excess supply situation in the labour market further precludes the possibility of supply behaving as a function of price. On account of this break down of the market mechanism on the supply side the price of labour varies independently of the demand and supply situation.

Our analysis of the labour market variables in Gujarat districts thus brings out the conclusion that they play a limited role in the allocation of labour in the sense that wage variations affects the demand for labour while they seem to be completely ineffective in the pricing of labour in the agricultural sector. Demand for labour is found to be sufficiently responsive to wage rates along with some other variables; but supply of labour seems to be determined outside the system of the economic variables in the labour market. Consequently, wage rate determination is also independent of the market conditions.

Thus it is the supply side where the labour market mechanism seems to break down in Indian agriculture. In order that the supply at a point of time is flexible and responsive to wage rates, and thus the allocation and pricing of labour proceeds on the basis of market forces, the necessary condition lies in the availability of alternative employment opportunities. It is the lack of this conditions which makes the rural labour markets indifferent to economic logic.

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## THE AGRICULTURAL LABOUR PROBLEM IN THANJAVUR AND THE NEW AGRICULTURAL STRATEGY

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Thanjavur district is advantageously situated in the Cauvery delta, where canal irrigation from Cauvery river was known to have been in existence as far back as the second century. The network of the canal system spread throughout the district has earned credit to the river Cauvery for the highest utilization of irrigation water. The district ranks first in Tamil Nadu with 84 per cent of the net sown area benefiting from assured irrigation facilities. In 1965-66, a third of the area was sown more than once, which might have now risen to nearly a half (highest in the State) on account of various agricultural developmental pro-

grammes introduced in the district like the Intensive Agricultural District Programme (IADP), High-Yielding Varieties Programme (HYVP) (in 1966-67) and Multiple Cropping Programme (in 1967-68). Paddy is the most important crop grown extensively in the district, occupying over three-fourths of the gross cropped area of about 20 lakh acres. The district has been correctly described as the granary of Tamil Nadu, since it contributes a little more than a fourth of the State rice production and nearly a half of the requirements for public distribution met through Government procurement. Because of its achievements in increased agricultural production, the district is treated as an innovative district among the IADP districts. The district has its share of problems and weak points. The draining of water from the fields, particularly during the North-East monsoon, has remained a serious problem for decades. Equally old are the acute problems of tenancy and strained landlord-labour relations. For long, the district has witnessed tension created by these and other social factors. With this necessary background, we are now well set to study the agricultural labour problem in this district, whose prosperity has been further raised by the recent green revolution.

### *Crop Pattern and Rainfall : Crucial Role to Labour*

A study of crop pattern in this mono crop district is very important to understand and appreciate the agricultural labour problem prevailing in the area for quite long. The agricultural operations in the district gain momentum in the latter half of June (and first half of July in tail-end areas) after the release of water into the river from the Mettur Dam. With the delayed release of water caused by poor storage position created by erratic and late monsoons, the time available for the cultivation of the first crop has been steadily getting reduced over the years. On the other hand, the new HYV strains are of longer duration than the local varieties. Added to this is the necessity to carry out almost simultaneously ploughing and transplanting operations for the *kharif* crop of paddy over a vast area of about 12.5 lakh acres within a short period of four weeks. Because of these factors, the dependence on agricultural labour for timely operations during the sowing season becomes significant. The short duration *Kuruvai* paddy (in about 5 lakh acres) is harvested in October-November, when the North-East monsoon is active. The crop should be harvested, threshed, and transported quickly to avoid loss of paddy, both in the fields and on the threshing floor. Immediately after this, the field should be got ploughed and transplanted with the third season crop of *Thaladi* paddy. Almost during the same period, weeding must be carried out in single crop (long duration) lands growing *Samba* paddy cultivated over an area of about 7.5 lakh acres. These two months are the busiest part of the year coupled with heaviest and almost continuous downpour. It is natural that the demand for agricultural labour is the heaviest during this period making agricultural labour very crucial for successful and timely operations.

### *Labour Availability in the District*

Besides the mono crop pattern and rainfall, the labour availability in the district is low as compared to other districts of Tamil Nadu. For decades, labour was being imported from the adjoining districts to carry out the agricultural operations, notably harvesting and transplanting, in time. This phenomenon of em-

ploying labour from far off places is quite peculiar to the district. Over the years, this system has been so perfected that the outside labour could move from one village to another in a systematic and planned manner and find work for a few months before they return to their villages. Further, every group of outside labour has a set of villages and farmers for whom they work regularly year after year. To look into the rationale behind this arrangement, the number of agricultural labourers and the number of agricultural workers (including cultivators), per 100 acres of cropped area, were worked out but they were found to be not much different from that of other districts. As pointed out earlier, over three-fourths of the cropped area are irrigated in Thanjavur as compared to a mere one-third in the neighbouring districts and it is well-known that provision of irrigation water raises the labour demand. To account for this disparity in irrigation facilities and labour requirements between the various districts, the concept of standardised acreage<sup>1</sup> was introduced and this exercise has been found to be rewarding.

TABLE I—LABOUR AVAILABILITY IN THANJAVUR AND ADJOINING DISTRICTS

District	Percentage of gross irrigated area to gross cropped area	Percentage of labourers among agricultural workers	No. of agricultural workers per 100 acres of gross cropped area (standardised)		
			Agricultural labourers	Cultivators	Both
Thanjavur .. ..	77.1	48	36	39	75
Tiruchirappalli .. ..	35.0	23	31	103	134
Ramanathapuram .. ..	37.7	21	24	89	113
South Arcot .. ..	54.2	37	47	79	126
State average .. ..	45.0	30	34	78	112

The labour availability is the lowest (excepting the mountainous Nilgiris district) in Thanjavur among the 13 districts of Tamil Nadu. There are only 75 labourers per 100 acres in Thanjavur as compared to 134 in the adjoining Tiruchirappalli district. Again in Thanjavur, nearly a half of the agricultural workers are landless labourers as compared to only a fourth in the neighbouring Tiruchirappalli district and three-tenths in the entire State. The Farm Management Studies data collected by the Centre for Thanjavur place the percentage of family labour to total labour input on the farm at a meagre 25 for the entire district and still lower at 18 for the old delta.

The preponderance of landless labour and the low proportion of workers from the cultivator class are the special characteristics of agricultural labour in the district, and these, to a great extent, have accentuated the labour problems arising out of shortage of labour during peak seasons in the district. This gets a communal twist when we notice that more than half of the landless labourers

1. From the Farm Management Studies conducted in Tamil Nadu it was seen that the labour requirement for irrigated crops is about 3 times the labour put in for unirrigated crops. The gross irrigated and unirrigated acreage in each district was weighted by 0.75 and 0.25 respectively to obtain the standard acreage.

are *Harijans*. (This percentage is much higher at 90 for East Thanjavur, where the labour problem is very acute.) The labour problem also acquires a political touch, since most of the important political parties in the State take a very active interest in the organization of agricultural labour in the district.<sup>2</sup> The sheer size of the labour force and the active interest of various political parties in their affairs have contributed significantly to improve the bargaining power of the landless labourers vis-a-vis the landowners.

### *The System of Pannaiyals or Permanent Farm Servants*

To appreciate the labour problems in the district, a brief survey of the various categories of labourers and the system of wage payment prevalent in the district is useful. The practice of employment of labour from neighbouring districts on a large scale has already been touched upon. Another institution, which was very popular during the 'forties, and which is now practised with necessary safeguards by the big landowners of the district, is the system of *Pannaiyals* or permanent farm servants. According to this system, farm servants (usually in pairs of husband and wife) were widely employed by medium and large farmers on a permanent basis and they were given food and clothing and housing. In addition, they were given a little cash on a daily or monthly basis. In addition, they were also given *manyam* lands measuring 25 to 35 cents for enjoyment during the tenure of their employment under the particular landowner; the labourer was allowed free use of bullocks, farmyard manure, seeds, etc., from the farm, but no purchased inputs like fertilizers. But with the enforcement of the Thanjavur Pannaiyal Act of 1952, which prescribed rates of wages and offered security of service and other privileges to the *Pannaiyals*, the services of most of them were terminated in the course of next four or five years, reducing them to the status of casual labourers. Some recent field studies by the author place the share of permanent farm servants as one-sixth of the total hired labour. Presently, the annual farm servants are normally employed only for a year (sometimes for 9 or 10 months) at a time on oral contract (although he may continue to work with the same landowner for a number of years) to circumvent the provisions of the Pannaiyal Act. They are free to work outside when there is no work on the farm and have freedom to stop work even before the year is over. In the old delta (East and North Thanjavur), they are either given annual kind wages of about 350 to 450 kgs. of paddy (for a husband and wife) or *Kalavadi* at the rate of one-eighth of harvested produce from about 5 acres of land. In addition, they are paid a daily wage of about 5 kgs. of paddy on the days they work on the farm plus a small cash of 15 to 25 paise. While no food is provided, clothes are offered during festival days. Free residential accommodation and *manyam* lands are provided to the permanent farm servants. They find work for about 8 months on the farm and for about 6 weeks outside. Their annual wages range between Rs. 550 and Rs. 650 for an adult male, giving a daily average of Rs. 2.35 to Rs. 2.70 for the working days. For harvesting operations, they are allowed to join with other labourers who are paid as wages a portion of the harvested produce. Likewise, overtime allowances are paid to them during busy seasons when they work for more than the normal hours of duty. The nature, terms and conditions of employment of permanent farm servants vary widely between the different regions

2. The landowners in the district have also a few organizations to project their views and safeguard their interests.

and slightly between different villages of the same region. In certain parts of the old delta, no *manyam* lands are given, but sweepings of threshing floor amounting to 2 to 3 bags are given. In some other parts, two meals are provided instead of daily payment of paddy. In the new delta (South Thanjavur, benefiting from the Cauvery-Mettur Project since 1933), permanent farm servants are not so common as in the old delta because of fewer number of large holdings and lower proportion of area under double cropping of paddy. In some parts of the new delta, permanent farm servants (only males) are brought from adjoining districts and employed for about 9 to 10 months. During their service, they are provided with 3 meals daily and free housing. About Rs. 300 are paid in one instalment as cash wages. When they return to their native places, they are given a gift of 2 to 3 bags of paddy as an incentive to return for work to the same master next year.

The institution of annual farm servants has been found to be serving well the needs of the landowners and labourers. While the former is assured of labour supply throughout the year, particularly during peak seasons, the latter has security and continuity of employment. The permanent farm servants get work for about 9 months as compared to 6 to 7 months of employment for casual labourers and receive about 10 per cent more wages in addition to free housing. The break of *Pannaiyal* system has also contributed to the destabilisation of the labour situation in the district. The institution of annual farm servants may be encouraged to spread with advantage to both the parties.

#### *Share for Labour in Increased Production*

From the Report of the Commission set up by the Government of Tamil Nadu to inquire into the problems of agricultural labour in East Thanjavur, we have estimated the annual employment of an adult casual labourer at 160 days for single crop areas and 210 days for double crop areas. The annual earnings of a family (husband and wife) are estimated at Rs. 494 and Rs. 732, respectively, for the single crop and double crop areas.<sup>3</sup> "The present practice is that for work unconnected with harvest, wages are paid usually two-third or three-fourth in kind and the remainder in cash."<sup>4</sup> Such a high proportion of kind wages has been in vogue for many years with a view to command ready labour, since this system was found favour with the labourers.

An important feature in Thanjavur is the practice of employment of hired labour for harvesting operations on a contractual basis. Presently, the labourer is paid 6 out of 54 measures or 11 per cent of produce harvested. While the practice of giving wages in kind protects the labourers from the decline in the value of real wages in the context of increasing prices, the practice of giving a proportion of the produce harvested provides an opportunity to the labourers for a share in the fruits of improved technology. With the introduction of HYV paddy crops, in recent years, the yield per acre has risen by a third to a half depending upon the varieties. Such a sharing of increased production between the landowners and labourers is possible only under this system, which seems to be widely prevalent only in Thanjavur district. While most of the landowners do not grudge such sharing, at least to buy peace and to carry the agricultural opera-

3. Report of the Commission of Inquiry on the Agrarian Labour Problems of East Thanjavur District, Government of Tamil Nadu, 1969, p. 9.

4. *ibid*, p. 15.



tions in time, a significant section finds objection to the payment of as much as 11 per cent of the produce just for one of the many operations. According to the Commission cited earlier, "harvest work is arduous full day work for a short period under great stress and this earning helps the labourer and his family to subsist for the ensuing workless period after harvest."<sup>5</sup>

### *Impact of HYVP on the Labour Situation*

The IADP was inaugurated in the district in 1960-61 and in the course of the next few years, the demand for labour has steadily gone up on account of increased use of fertilizers and pesticides and adoption of improved agricultural practices. The next important phase came in 1966-67 with the introduction of the HYVP for paddy in the district. By 1967-68, almost the entire traditional *Kuruwai* area of 3 lakh acres has been covered with the locally evolved high-yielding strain of ADT-27, which is more labour intensive than its predecessors. The higher labour input has been caused on account of more number of ploughings, line planting, intensive weeding, higher level of fertilization and harvesting of a higher volume of produce. The Farm Management Studies conducted by the Centre in Thanjavur during 1966-67 place the additional demand for labour at 26 per cent for ADT-27 in comparison with the varieties replaced and at 16 per cent for CO-25, a locally evolved HYV strain cultivated widely in *Samba* and *Thaladi* seasons over 6 out of 12 lakh acres. The additional demand is more pronounced, being 69 per cent and 35 per cent, in the case of hired labour, which is more relevant to our discussions here. Various HYV studies carried out by the Centre in different districts have also brought out similar results. Hired labour was found to be the most important item (sometimes next to fertilizers) accounting from a third to one half of the total cash expenditure. The Programme Evaluation Organisation data for Tamil Nadu also corroborate our findings.

TABLE II—PER ACRE LABOUR EXPENDITURE IN CASH

(in Rs.)

Season	HYV paddy	Local paddy	Percentage of HYV farmers reporting labour problems
Kharif 1967 .. ..	211	108	24
Kharif 1968 .. ..	182	87	61

Source : Reports on Programme Evaluation Organisation Studies on HYV Programmes for Kharif 1967 and 1968.

The next phase came with the introduction of foreign exotic higher yielding strains like IR-8, IR-5, etc., on a large scale from 1969-70 in the place of local HYV strains like ADT-27, CO-25, etc. These strains are still more labour demanding for various operations like picking seedlings (deep rooted and short but delicate stem needing careful plucking), line transplanting, more intensive interculture, harvesting and threshing of larger output (grains stick more firmly to the earheads) and higher level of application of fertilizers and pesticides. The Farm Management Studies data collected by the Centre have shown that an acre of IR-8 paddy requires roughly 40 per cent more labour than ADT-27, the respective figures being 75 and 53 man-days.



*Pressure on Labour on Account of Multiple Cropping Programme*

The multiple cropping programme or *Samba* conversion programme, as it is locally called, has not only pushed up the demand for labour but has also placed a premium on timely operations. Uptil 1966-67, paddy was grown over an area of 15 lakh acres distributed among the three seasons as follows: *Kuruvai*—3 lakh acres, *Samba*—9.5 lakh acres and *Thaladi*—2.5 lakh acres. The main objective of the *Samba* conversion programme, first launched in 1967-68, was to convert a major portion of the single cropped lands growing a long duration paddy into double crop lands to raise two short duration paddy (or one short duration paddy followed by pulses, cotton, green manure crops, etc.). Under this programme, by 1969-70, the area under paddy alone has gone up by 10 per cent and under other crops by 12 per cent, resulting in a rise of 11 per cent in the gross cropped area.

More than the rise in aggregate demand for labour created by various agricultural developmental programmes like IADP, HYVP with local strains, HYVP with exotic strains and multiple cropping programme, it is the appreciable rise in demand for hired labour during the crucial periods of plant growth which has decisively affected the labour situation in Thanjavur. For example, during October-November, harvesting and threshing of *Kuruvai* paddy has now to be carried over 5 lakh acres against only 3 lakh acres in 1966-67 and ploughing and transplanting of *Thaladi* paddy (immediately after the harvest of *Kuruvai*) are to be carried on 4 lakh acres against only 2.5 lakh acres previously. Such a steep rise in labour demand by nearly 60 per cent in such a short period, and that too, during the monsoon months has made the labour a critical input. In other

TABLE III—INCREASE IN DEMAND FOR AGRICULTURAL LABOUR DURING PEAK SEASONS ON ACCOUNT OF MULTIPLE CROPPING

Month	Operation	Extent of area on the basis of		Average numbers of rainy days	Mean rainfall	
		1966-67 crop pattern	1970-71 pattern (programmed)		(milli-metres)	Percentage to annual total
October	1. Harvesting and threshing of <i>Kuruvai</i> .. ..	1.5	2.5	9.4	249	22.5
	2. Weeding <i>Samba</i> .. ..	3.5	2.5			
	3. Ploughing and transplanting <i>Thaladi</i> .. ..	1.0	2.0			
November	1. Harvesting and threshing of <i>Kuruvai</i> .. ..	1.5	2.5	11.3	194	17.5
	2. Weeding <i>Samba</i> .. ..	6.0	5.0			
	3. Ploughing and transplanting <i>Thaladi</i> .. ..	1.5	2.0			

words, the area under cultivation has risen while the time available for the harvesting and threshing of first crop, and for preparing the land and transplanting the seedlings for the second crop has decreased. Such a situation would naturally

place more bargaining power at the hands of the labour, which was already well-organized and able to exert pressure by collective bargaining, notably during rush seasons of transplantation and harvesting. It is significant to note that the agitational approach by labour has taken an acute turn only during the last 3 years, which well coincides with the introduction of HYVP and multiple cropping programme in the district.

### *Collective Bargaining by Agricultural Labour*

In a number of places it was pointed out that the labour in Thanjavur is quite assertive. "To press the demand for higher wages, organized labour boycotted harvesting work and obstructed outside labour doing such work in places where labour was well-organized. This led to clashes and violence in many places and the consequent disruption to agricultural operations."<sup>6</sup> In October, 1967 (Man-nargudi Accord), the representatives of labour and landowners agreed (in the presence of the District Collector) for a rise of 10 per cent over the wages prevailing then for harvesting operations in different areas. By the Tiruvarur Agreement (June, 1968), wages for transplanting, for men and women, were fixed at Rs. 2.68 (6 litres of paddy plus Re. 1) and at Rs. 1.65 (5 litres of paddy plus 25 paise). According to these agreements, imported labour can be used for harvest provided the local labour was utilized and the landholders have the right not to employ recalcitrant, inefficient and lazy labourer. But, these agreements did not bring the much-needed peace in the agricultural front. Then came the Kilvenmani tragedy in December, 1968, leading to the appointment of the one-man Commission referred to earlier. In January, 1969, the Collector announced an interim wage structure for harvesting operations whereby the wages were increased at a uniform rate of  $\frac{1}{2}$  litre of paddy, which worked out to a rise of 9 to 12 per cent in different areas depending upon the then locally prevailing wages. The one-man Commission submitted its report in May, 1969 and all its recommendations with regard to wages were immediately accepted by the Government. The Commission was of the opinion that imported labour is necessary to carry out the operations in time and considered a 10 per cent increase in wage rates to be feasible and fair. The recommended uniform rates of wages for all the areas are as follows:

Operations	Recommended wage rate	
	Men for 8 hours (Rs.)	women for 7 hours (Rs.)
Ploughing, levelling, etc. .. .. .	3.00	—
Transplanting, weeding, etc. .. .. .	—	1.80
Off-season work .. .. .	2.50	1.75
Harvesting .. .. .	6 litres out of 54 litres of paddy harvested or 11 per cent.	

The Commission had also recommended that the wages once fixed should be reviewed by a Committee once in 3 years. With the acceptance of the recommended wages by all the parties, complete peace has been now prevailing for the past one year.

6. *op. cit.*, p. 7.

*Prospects for the Future*

With the wage structure announced by the Commission, the wage rates for harvesting has risen by about 50 per cent in real terms (from 4 to 6 litres for every 54 litres) during the last 3 or 4 years. The rise would be higher by another one-third if we also take into consideration the rise in yield per acre consequent to the replacement of local varieties of paddy with HYV strains. The rise in wages for other agricultural operations would have been at least 25 per cent. With the gradual replacement of locally evolved HYV strains like ADT-27, and CO-25 by the exotict strains like IR-8, the per acre yield can be expected to go up still further, a substantial share of which would also go to the labourers. On these counts, one may expect the continuation of peaceful conditions in the agricultural labour front for the next few years to come. But one has to keep a watchful eye, since the introduction of the multiple cropping programme and the spread of highly labour intensive HYV crops like IR-8 over wide areas are likely to push up appreciably the demand for labour during the rush seasons synchronizing with the monsoons.

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THE RECENT AGRICULTURAL REVOLUTION AND  
THE AGRICULTURAL LABOUR

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The recent agricultural revolution in India has, no doubt, the potentials of bringing us much closer to our object of achieving self-sufficiency with regard to foodgrains. However, it may not be an unmixed blessing unless some other problems that are likely to arise in its wake, are effectively tackled. One such problem, having important welfare implications, is concerned with the impact of the revolution on the absolute as well as the relative economic position of the rural labour, especially the agricultural labour. This paper attempts to study this problem as it has emerged in the State of Punjab.

According to official pronouncements, there are only four crops, namely, rice, wheat, bajra and maize in the case of which high-yielding varieties have been introduced. This programme was started in 1966-67 and its progress so far has been shown in Table I.

It is clear from Table I that in the case of wheat, the pace of adoption of high-yielding varieties has been the highest. In 1968-69, out of the total area devoted to wheat (which is itself larger than the area devoted to any other crop), 58 per cent was under the high-yielding varieties. In the case of other crops such a ratio, as is clear from Table I, was quite low. In other words, we are perfectly justified in saying that the recent agricultural revolution in the Punjab is synonymous with the wheat revolution and any impact of the introduction of the