Family Labourforce as a Determinant of Tenancy-Labour Interlinked Contract

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Abstract:

In this interlinked contract land market is tied with labour market. The landlord leases-out small size of land to the landless agricultural labour households under fixed rent system prior to agricultural peak season on the basis of their commitment to work under his field through out that season. A household can bind itself in such a contract if and only if it has certain number of family labour force. But which households can ultimately tie them in such a contract is totally decided by the market force in that village economy where the family labour force is the determining factor. The paper also shows that this interlinked contract may generate involuntary unemployment in the agricultural labour market and under certain conditions the tied households can not only cross the reservation level of income but also can cross the poverty line**.**

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Introduction:

The problem of interlinkage in the agricultural labor market is widely known. It was Bardhan and Rudra (1978) who during their village survey had observed the existence of labour cum credit contracts in many villages of West Bengal. According to their findings, workers are employed in the peak season after being offered consumption loan in the lean season at subsidized rate of interest. Two important theoretical explanations of credit labour interlinked contract were developed by Basu (1984) and Bardhan (1984). Basu explained this interlinkage in the light of Lender's risk hypothesis and Bardhan explained this in the light of Employer's Risk Hypothesis. According to him the landlord presumes that there may be excess demand for labour at the agricultural peak season i.e. during the time of sowing and harvesting. In order to remove this uncertainty he provides consumption loan to the workers on the basis of their pre-commitment to work in his field in the next peak season. Sarap (1991) in his intensive village level survey in the Sambalpur district had observed that the agricultural labourers mainly take loan from the landlords or from the professional moneylender for consumption purposes. Gupta (1987) explained this interlinkage from different angle. He explained that on the basis of consumption-efficiency argument. He told that due to lagged consumption efficiency relationship the landlord prefers to give consumption loan to the labourer in the agricultural slack season on the basis of his commitment to work in his field in the next peak season. According to him, this may help the landlord to get more nourished worker in the agricultural peak season. Kundu and Chatterjee (1998) had shown that, this

type of interlikage would be possible if and only if the landlord can force the labourer to take his food only at his residence. This can only check the moral hazard problem of this nutrition based credit labour interlinked contract.

Actually all the models of interlinkage in the rural credit markets, ultimately the agent or the peasant or the agricultural labourer is by assumption pressed down to a given reservation utility and so the agent does not gain anything from the interlinked contract. Bell (1988) had shown that the peasant might be worse off with an interlinked set of transactions than with a set of separate bilateral bargain. Actually, most of the literatures of interlinked contract are related with credit markets. Again no theoretical model is yet developed to show that the agent or the peasant can cross the poverty line after binding himself in an interlinked contract. Here we want to develop a new type of interlinked contract where land market is tied with labour market. To secure labourers at crucial times, cultivator households use this tenancy-labour interlinked contract. Using this type of interlinked contract we want to answer why family farm either owner or tenant operated can be continued to be a more dominat mode of agricultural production organization than large scale farms based on hired labour in the low-income developing economies.

The landlord (the big farmer or small farmers who possess more than three hector land) wants to lease-out certain portion of land (generally not more than one acre land) to the labourer against fixed rent and cultivate the remaining portion of the land with the help of hired labour. Actually the landlord feels that it is difficult to monitor the effort the labourers pay in the field during the time of cultivation, which will also affect the level of output. Distribution of land in many fragments and the difficulty of its management also force the landlord in this type of interlinked contract. Moreover it ensures the availability of labourers from tenant families when required. All lessors belong to big landowners who want to cultivate the land with the help of hired labour. Inability to appoint a permanent labour or lack of effective family labour that can constantly monitor the hired labourers in the field is the main cause behind that. So, they prefer to lease out certain portion of land to any other person because they know, from that part of land, they can get certain amount of return at the end of the agricultural season. The leessees belong to the agricultural labour household. In the presence multiple cropping, the concept of

agricultural slack season is gradually disappearing. But the agricultural labourers are facing lots of uncertainties at the time of getting job in the agricultural sector. One of the major reasons behind that is the gradual increase of marginal farmers. These marginal farmers prefer family farming on the one hand and ready to work as an agricultural labourer in his leisure day on the other hand. So fall of demand and rise of supply in the agricultural labour market creates uncertainty for the main agricultural labourers to get job in the agricultural peak season. Sometimes it has been observed that it is difficult for an agricultural labourer to get 150 full days of employment annually even in the multiple cropping areas. So sometimes they face shortage of money to purchase essential commodities mainly rice. The existing literature of credit-labour interlinkage, described that in this situation they have to demand loans from the landlords and professional moneylenders mainly for consumption purposes. They now prefer to take land in lease from the landlords so that they can cultivate that with the help of family labour force. The tenancy contract is under fixed rent contract. At the end of the season, they have to pay the rent to the landlord and keep the remaining portion for self-consumption. This also helps the tied labourers cum tenants to maintain the subsistence level of consumption as well as the nutritional level. Apart from this they can generate personal rapport with the landlord and using that they can get employment in the landlord's field during agricultural peak-season. The tied labourers also avoid shirking because they know that if they are caught, then he will not be renewed in this type of contract in the next year. The landlord now can avoid the appointment of permanent labour in the agricultural peak season if tied labourers do the cultivation. Employment of migrant labour is costly because apart from wage, food and shelter also have to be arranged for them. Kundu and Chatterjee(2001), using consumption efficiency hypothesis had shown that the landlords always prefer local to migrant labourer during the time of cultivation because the former can be tied in a nutrition based credit labour interlinked contract. This tie-up of tenancy labour interlinked contract can help the landlord to give him nutritious labourer during that crisis period. Actually this type of interlinked contract can benefit both the landlord and the tenant. But whether the labourer is willing to take the interlinked contract or not mainly depends on his families' able-bodied members. In the previous literatures, little alternative options were available to the labourers or peasants. They have to tie

themselves in the interlinked contract for survival purposes. But in this model the labourer has other two options i.e. working purely as an agricultural labourer or working in the non-farm sector. Actually it is observed that the labourers are not willing to send their wives to work in the landlord's field as an agricultural labourer but always encourage her to help him during the time of cultivation of the leased-in land. Sometimes their children also help them to do that. So in this model the able-bodied family members imply the family labour force. Here we assume that each family possesses only one working member who works as an agricultural labourer outside and all the members are homogeneous in nature. The paper is divided in to three sections. In Section-1 we shall discuss the situation at which an agricultural labour household will be eager to take land in leased-in form for cultivation with the help of family members at the beginning of the agricultural peak season for certain specific time period. In Section-2 we shall discuss the behaviour of the employer-cum landlord and investigate what strategies he will follow to maximize his gain. And in Section-3, we shall determine the value of family labour force at which this tenancy-labour interlinked contract will be sustained in equilibrium.

Section-1

The Model:

Initially we assume that there two types of economic agents in the village economy. The Landlord who owns T amount of land and the agricultural labourer who apart from doing work as a daily casual agricultural labourer also wants to cultivate few plot of land as a tenant under fixed rent system with the help of his family members. The total number of able-bodied working members (both male and female) of the agricultural labour household is 'n' but only the male member of the household can work outside. The female able-bodied members and children are not allowed by the family to work outside. The household takes't' amount of land as leased-in from the landlord for cultivation with the help of family labourers. Under fixed rent contract, the rent is 'R' against per unit of leased-in land. The remaining produced crop is used for self-consumption by the agricultural labour household. The tenant also works under the landlord as an agricultural labourer where the daily wage paid to the labourer is a combination of cash and food and the labourers have to take their food at their work site. So total payment in form of wage

in a particular day becomes $\hat{w} = w + x$. Here 'w' is the payment made in form of cash and 'x' is the payment made in form of kind and the price of 'x' is set to be unit.

The nutritional efficiency of the labourer depends on 'x' and following instantaneous consumption efficiency argument, the efficiency function of each labourer can be expressed as $e(x) = x^{\beta}$ where $0 < \beta < 1$. The total number of days the labourer works under the landlord is '*d*'. So the nutritional efficiency function of each labourer in any particular season can be expressed as $E(x) = dx^{\beta}$ .As the labourer household has '*n*' number of working members and each lagricultural labour household takes '*t*' amount of land in leased in form, the total agricultural production function of the household can be explained as

$$y = ntdx^{\beta} \text{.....(1)}$$

The cost of cultivation is $c = c(t)$ where $c' > 0 \,\&\, c'' > 0$. The total payment the tenant has to make in form of rent is $'Rt'$ and the total wage income of the household where only one member works as an agricultural labourer is $d\hat{w}$. If the price of the produced crop is set to unit then the total earning of the household becomes:

$$TE_{AS} = ntdx^{\beta} - c(t) - Rt - e(t) + d\hat{w} \text{.....(2) where}$$

$$[\, c' > 0, c'' > 0, e' > 0 \,\&\, e'' > 0 \,]$$

Here $'e'$ is the effort and opportunity cost sacrificed by the tenant and other family members during the time of cultivation of the leased-in land.

The tenant cum labourer can only decide 't'. So we have

$$\frac{dTE_{AS}}{dt} = ndx^{\beta} - c'(t) - e'(t) - R = 0 \quad \text{i.e. } ndx^{\beta} = c'(t) + e'(t) + R \text{.....(3)}$$

As $\frac{d^2TE_{AS}}{dt^2} = -c''(t) - e''(t) < 0$ we can claim that the above relation (3) gives the maximum value of 't' say $'t^*'$.

The Equation (3) gives $\frac{dt^*}{dn} = \frac{dx^{\beta}}{c''(t) + e''(t)} > 0$.....(4)

So we can have the following propositions:

Proposition:1. *The total amount of land the household will be interested to leased in is positively related with the total number of able bodied working members of that household.*

The landlord has a belief of consumption efficiency argument and wants to give 'x' as much as possible. But as he is giving meal to the labourer only at lunch, he cannot exceed '*x*' beyond $\hat{x}$. Here we can consider $\hat{x}$ as the maximum amount the landlord can pay in order to offer the most nutritious meal to the interlinked labourer in lunch. Actually, it has been empirically observed that during lunch, the labourer is offered a meal with a well-balanced combination of carbohydrate protein fat, vitamin minerals etc. As $\hat{w}$ is totally decided by the Panchayat the landlord has no control on $\hat{w}$. He can only control the nutritional efficiency of the labourer through offering him $\hat{x}$. Here instantaneous consumption-efficiency relationship is considered. So it is obvious that, $\hat{x} < \hat{w}$.

So the indirect total earnings function of the household becomes

$$TE_{AS}(n) = nt^*(n)d\hat{x}^{\beta} - c\{t^*(n)\} - Rt^*(n) - e\{t^*(n)\} + d\hat{w}$$

So $\frac{dTE_{AS}}{dn} = t^*(n)d\hat{x}^{\beta} > 0$ and so $\frac{d^2TE_{AS}}{dn^2} = t_n^* dx^{\beta} > 0$ .....(5)

So TE_{AS} curve with respect to 'n' is positively sloped and convex.

The worker apart from binding them into a tenancy labour interlinked contract can work as a plain casual agricultural labourer. Here also the wage income is same but these casual labourers can work more days than the interlinked labourer. Let the number of days the casual labourer can get employment be d_1 and the total wage income of the labourer as well as the agricultural labour household in any particular agricultural season becomes $d_1\hat{w}$. We can write that as

$$TE_{AL} = d_1(w + \hat{x}).....(6)$$

The average number of days a main agricultural worker can get employment in a specific year is just higher than that of interlinked labourer. The reason behind that is, the main agricultural labourers can devote full effort to find job in the agricultural season and always available. But the interlinked labourer has an involvement in cultivation in his

leased-in land. So he is not always available for work through out the agricultural season. Hence $(d < d_1)$

The worker can work in the non-farm sector where all the working members of the family can be involved in the non-farm occupation. Here, the output or earnings totally depends on manpower of the family. Here the capital is supplied by 'Mahajan'. The family with the help of their efficiency and manpower produces the commodity and returns the finished goods to the supplier of raw materials and receive a certain amount. So the total earnings of a family from non-farm sector i.e. TE_{NF} can be expressed as

$$TE_{NF} = \Psi(n) \quad \text{where } \Psi'(n) > 0 \,\&\, \Psi''(n) < 0 \text{ when } n \le n_3$$

and $$= TE_{NF}^{*} \text{ when } n \ge n_3$$

Hence we see the existence of surplus labour in the family at the time of producing non-farm commodity when $n \ge n_3$

Suppose we consider the minimum value of 'n' be 1.

If that labourer works as a main agricultural labourer then his total wage income of the household will be

$$\overline{TE}_{AL} = d_1(w + x) \ldots (when \;\; n = 1) \ldots\ldots\ldots\ldots..(7).$$

If the household with single member works as a labourer as well as tenant with the help of the sole-able bodied member, then its earnings from the interlinked contract becomes

$$\overline{TE}_{AS} = \bar{t} dx^{\beta} - c(\bar{t}) - R\bar{t} - e(\bar{t}) + d\hat{w} \quad (\text{where } t = \bar{t}, at \;\; n = 1) \ldots\ldots.(8)$$

If the household works as non-farm labourer, then at $n = 1$, the earnings will be

$$\overline{TE}_{NF} = \overline{F} = \Psi(1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(9)$$

Now at $x = \hat{x}$ and $n = 1$, $\overline{TE}_{AS(n=1)} = \bar{t} d\hat{x}^{\beta} - c(\bar{t}) - R\bar{t} - e(\bar{t}) + d\hat{w} \ldots\ldots\ldots\ldots\ldots\ldots(11)$

Now considering $(d_1 - d)\hat{w} > \bar{t} d\hat{x}^{\beta} - c(\bar{t}) - R\bar{t} - e(\bar{t}) \;\&\; d_1(w + \hat{x}) > \Psi(1)$

We have

$$\overline{TE}_{AL} > \overline{TE}_{NF} > \overline{TE}_{AS} \ldots\ldots\ldots\ldots\ldots\ldots\ldots(10)$$

Now we know that initially both TE_{AS} and TE_{NF} are positively related with 'n'. But if we consider that

$$\frac{dTE_{AS}}{dn} > \frac{dTE_{NF}}{dn} \ldots\ldots\ldots\ldots\ldots\ldots(10A)$$

Then we see in Fig-1, that the TE_{NF} will cut TE_{AS} from above. As we have already assumed that there exists only one male agricultural labourer of the household who works outside as a casual labour, TE_{AL} is parallel to the axis represented by ''n'. In Fig-1 we have two switch points i.e., e_1 & e_2 and beyond e_2 a family will be eager to take land in lease for cultivation and bound itself in interlinked contract provided it has at least $\hat{n}_2$ number of workable members of the family.

In that figure $\bar{z}$ indicates the poverty line and it is measured as per capita family income. So when the total family member of a household is just one then the poverty line will be $\bar{z}$. Beyond that the poverty line will be upward sloping with slope $\bar{z}$. Here we assume that the maximum number of family members of the household is n^+ where $n \in [1, n^+]$. The main agricultural labourer household is lying below the poverty line and due to lack of technical efficiency and capital the family involved in the non-farm sector can never cross the poverty line also. In the above figure, a family can cross the poverty line only through interlinked contract provided it has $\tilde{n}_2$ number of workable family members (which is observed through the switch point e_3) in Fig-1. This switch point will occur if and only if $\frac{dTE_{AS}}{dn} > \bar{z}$ i.e. the marginal revenue of the tenant household with respect to family labour force should be more than $\bar{z}$. In the Fig-1 it is clear that $\frac{dTE_{AS}}{dn} > \bar{z} > TE^*_{NF}$.

So Fig-1 shows that a labour household can cross the poverty line provided he bounds himself in tenancy labour interlinked contract. At this situation the household should have $\tilde{n}_2$ number of able-bodied workable family labour force and has to take $\tilde{t}$ amount of land in lease from the landlord.

If we ignore the poverty line then the agricultural labour household will be able to involve himself and his family in a tenant labour interlinked contract provided

$$\hat{n}_2 t d\hat{x}^{\beta} - c(t) - Rt - e(t) + d\hat{w} \geq TE_{AL} \quad \text{.....(12)}$$

Following Fig-1, that will happen when $n \geq \hat{n}_2$

We also have $Max(t) = \hat{n}_2 t d\hat{x}^{\beta} - c(t) - Rt - e(t) + d\hat{w}$ gives $t = \hat{t}$ when $n = \hat{n}_2$ .....(13)

So if a family wants to bind itself in interlinked contract it will take at-least $\hat{t}$ amount of land in leased-in form and that can be taken provided it has at least $\hat{n}_2$ number of family labour force.

Section-2

The objective of the landlord now is to decide the total number of tenants to whom lands will be given in lease i.e. N. Here it is assumed that R is administered and that is decided by the panchayat or is given exogenously. Actually here the landlord wants N number of labourers in to a tenancy-labour interlinked contract through giving them at least $\hat{t}$ amount of land. Total work force is assumed to be equal to total number of tenants. This can keep the tenant at the reservation level of earnings. Battese, Coelli and Colby (1989) considered both the family and the hired casual labour as homogeneous inputs. But Deolalikar and Vijverberg (1983), considering the district level data, had shown that family labour and hired casual labour cannot be perfectly substitute with each other. In fact according to them, family labour is more productive than hired casual labour in Indian agriculture. There is an inclination of the hired labour on shirking. So to check this moral hazard problem the landlord has to employ permanent labour through out the season. To minimize this problem during the time of cultivation there is an inclination of the landlord to tenancy-labour interlinked contract. We have already proved that, an agricultural labour household will tie himself in an interlinked contract provided it has $\hat{n}_2$ number of family labour force and at that situation it will demand at least $\hat{t}$ size of land for cultivation. At that situation, the landlord has to cultivate the remaining $(T - N\hat{t})$ size of land with the help of 'N' number of tied labourers when $T > N\hat{t}$.

The production function of the landlord is under constant return to scale and can be expressed as $Y = (T - N\hat{t})^{\alpha}(Nd\hat{x}^{\beta})^{\gamma}$. As the price of the agricultural commodity is set to unity the profit function of the landlord from the interlinked contract can be expressed as

$$TE_{LL} = (T - N\hat{t})^{\alpha} N^{\gamma} d^{\gamma} \hat{x}^{\beta\gamma} - d\hat{w}N + NR\hat{t} - C(T - N\hat{t}), when \alpha + \gamma = 1 \ldots\ldots\ldots\ldots(14)$$

The landlord has a belief on consumption efficiency argument. So he always prefers not one but few number of labourers because he knows that tenant with small portion of land will devote maximum effort to produce maximum amount of output in that field and this will help the landlord to extract predetermined amount of fixed rent from the tenants with

certainty. So he always prefers to lease out small portion of land to more than one tenant. Hence in the presence of interlinked contract we can cosider $N > 1$.

The first order condition derived from (14) gives

$$-\alpha\hat{t}(T-N\hat{t})^{\alpha-1}N^{\gamma}d^{\gamma}\hat{x}^{\beta\gamma}+\gamma(T-N\hat{t})^{\alpha}N^{\gamma-1}d^{\gamma}\hat{x}^{\beta\gamma}-d\hat{w}+R\hat{t}+C_{\hat{t}}(T-N\hat{t})\hat{t}=0.....(14A)$$

This will give the optimum value of N say N^*.

$$\frac{d^2TE_{LL}}{dN^2}=d^{\gamma}\hat{x}^{\beta\gamma}\{\alpha(\alpha-1)\hat{t}^2(T-N\hat{t})^{\alpha-2}N^{\gamma}-\alpha\gamma\hat{t}(T-N\hat{t})^{\alpha-1}N^{\gamma-1}+\gamma(\gamma-1)(T-N\hat{t})^{\alpha}N^{\gamma-2}$$
$$-\alpha\gamma\hat{t}(T-N\hat{t})^{\alpha-1}N^{\gamma-1}\}-C_{\hat{t}\hat{t}}(T-N\hat{t})\hat{t}^2<0$$

So, maximum N^* number of agricultural labourers are brought under the interlinked contract when each tied labourer will cultivate only $\hat{t}$ amount of land.

Now from (14A), if we also have,

$$\left|\{\alpha(T-N\hat{t})^{\alpha-1}N^{\gamma}-\alpha(\alpha-1)(T-N\hat{t})^{\alpha-2}\hat{t}N^{\gamma+1}+\gamma\alpha(T-N\hat{t})^{\alpha-1}N^{\gamma}\}+C_{\hat{t}\hat{t}}N\hat{t}\ \right|>\left|R+C_{\hat{t}}\ \right|.$$

then $$\frac{dN^*}{d\hat{t}}<0.....(15)$$

The above relation indicates, if the landlord has to give more than $\hat{t}$ size of land to a single tenant, then automatically the landlord has to bind less number of agricultural labourers into interlinked contract provided the above condition holds.

Next, we have to derive the conditions at which this tenancy labour interlinked contract will always be preferable to the landlord than any other alternative.

If the landlord wants to avoid the interlinked contract, then he can cultivate his land totally with the help of hired casual labourers. The hired casual labourer will be a combination of both casual local labour and migrant labour. The wage rate of the migrant labourer is assumed as w^M and we also assume that $w^M \geq \hat{w}$. But the payment made in form of kind remains unchanged. We also assume that maximum N^* number of local labourers can be employed in the production activity through out the season on casual basis. As the landlord is cultivating his total land with the help of hired labour, more than N^* number of labourers are required and migrant labourer can fulfill that deficiency. Suppose the total number of migrant labourers employed in the production process be denoted as N^M. Apart from employing migrant labourer, the landlord is forced to bear the cost of migration and that can be expressed as $C^M = C^M(N^M)$. Again to monitor the

hired labourers, the landlord now has to employ a permanent labourer through out the season and the total payment to the permanent labourer is w^P. At this situation the net earnings of the landlord becomes

$$TE^*_{LM} = T^{\alpha}(N^* + N^M)^{\gamma} d^{\gamma} \hat{x}^{\beta\gamma} - d\hat{w}N^* - dw^M N^{M*} - C(T) - C(N^M) - w^P \ldots.(16)$$

Here we assume that the landlord can employ maximum N^* number of local labourers. If the maximum N^{M*} number of migrant labourers are employed by the landlord, then the landlord will still prefer the interlinked contract provided $TE^*_{LL} > TE^*_{LM}$ and that will happen if and only if

$$dw^{M*} N^{M*} + C(N^{M*}) + w^P + \{C(T) - C(\hat{T}) > T^{\alpha} N^{*\gamma} d^{\gamma} \hat{x}^{\beta} - \hat{T}^{\alpha} N^{\gamma *} d^{\gamma} \hat{x}^{\beta\gamma} + R\hat{T} \ldots..(17)$$

The above inequality will hold if and only if w^M, $C(N^M)$ and w^P will take quite higher value i.e. if wage of the migrant labourer, cost of bringing migrant labourer in that area and the wage of the permanent labourer becomes very high.

The landlord may lease out his total land to a single farmer. In that situation his earnings will become $T\hat{E}_{LR} = RT$.

Now $TE_{LL} > T\hat{E}_{LR}$ provided

$$\overline{T}^{\alpha} N^* d^{\gamma} \hat{x}^{\beta\gamma} - C(\overline{T}) - d\hat{w}N^* > R(T - \overline{T}) \ldots\ldots\ldots where (T - N\hat{t}) = \overline{T} \ldots\ldots\ldots\ldots.(18)$$

The left side of the above inequality gives the net earnings gained by the landlord through interlinked contract and the right side of the inequality gives the total rent sacrificed by the landlord. If the gain is more than the sacrifice, then the landlord will always prefer this interlinked contract.

If the two conditions mentioned in (17) and (18) hold, then the landlord will always be interested in tenancy-labour interlinked contract.

If maximum N* number of labourers are available in that rural economy then it is not possible for the landlord, to distribute total 'T' size of land giving $\hat{t}$ size to each one i.e. we can say that $T/\hat{t} \leq N^*$.

If the landlord offers only $\hat{t}$ size of land to each N* tenants then the households who have at least $\hat{n}_2$ number of family labourforce can get the benefit of this interlinked contract. But this interlinked contract will keep those households at the reservation level of earnings and with this it is not possible for them to cross the poverty line $\bar{z}$. To know

at which value of 'n' the above tenancy-labour interlinked contract will ultimately held we have to consider both the labour demand curve and labour supply curve.

Section-3

If we look at Figure-2A and Figure-2B, we observe an upward raising curve representing the relationship between $t \& n$ (from relation (4)) and a downward sloping curve representing the relationship between $t \& N$ (from relation (15)) respectively. When $n = \hat{n}_2$, each tenant is given only $\hat{t}$ size of land and total N* number of labourers are tied into interlinked contract. Again each tenant will be given t^+ size of land provided the landlord prefers the households with n^+ number of family labour force. At that situation altogether N^+ number of tenants will be tied into interlinked contract. Combining Figure-2A and Figure-2B, we can draw Figure-2C which shows different combinations of $n \& N$ the landlord prefers in his interlinked contract. From the figure it is clear that the relationship between $n \& N$ are negative provided $\hat{n}_2 \le n \le n^+$. The curve Figure-2C can be called $N^D n^D$ curve or the demand curve of N with respect to n. .

Now we have to see the availability of the agricultural labour households with different family size in the village who, can be tied into interlinked contract. Actually after the breakdown of the joint family system, the family size of most of the households is not high. As there is only one earning member of the family, the total available labourforce N can come from households with different family size. We assume that the relationship between $N \& n$ is positive when $1 \le n \le \overline{n}$ and negative when $\overline{n} \le n \le n^+$. So the curve $N^S N^{S1} N^{S2}$ in Figure-3 represents number of different households with different family size. We assume that at $n = \overline{n}$ the maximum number of households in the village is N*. We also assume that total number of households with only 1 member in the family and n^+ number of members in the family is same and that is $\overline{N}$ each.

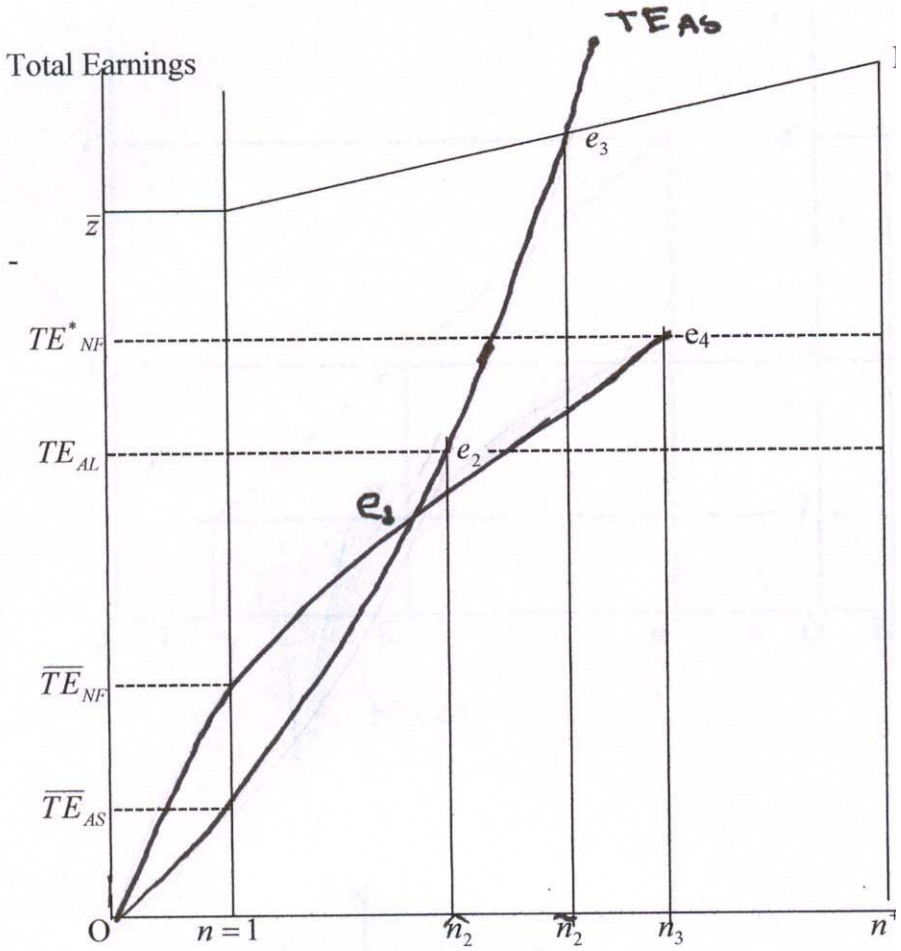
Now we super impose the demand curve drawn in Figure-2C on Figure-3 to get the equilibrium value of 'n'. In the Figure-3 $\overline{N} > N^+$. As we know from Figure-1 that $\hat{n}_2 > 1$. Now if $\hat{n}_2 < n < \overline{n}$, then equilibrium point occurs at E_1 when the downward sloping labour demand curve cuts upward slopping supply curve from above. In this situation the households with n_2* number of family labour force will be tied into interlinked contract. As in the figure $n_2 * > \hat{n}_2$, we can claim that the existing tied

households can keep themselves above the reservation level of earnings. But all the local labourers fail to get job at this situation and the problem of involuntary unemployment will arise in the agricultural labour market and that is N_1N^*. Nearer the difference between $\hat{n}_2$ & $\overline{n}$ less will be the involuntary unemployment generated in the agricultural labour market and that will totally disappear when $\hat{n}_2 = \overline{n}$. If it is observed that $n_2^* \geq \tilde{n}_2$ then we can claim that the tied households can also touch (cross) the poverty line. But if $\hat{n}_2 > \overline{n}$, then from Figure-3, it is clear that the problem of involuntary unemployment will become more acute in the agricultural labour market and equilibrium value of $'n'$ will occur at very near to or at n^+ . In Fig-3 it is observed that when the demand curve is $N^{D2}n^{D1}$ then the equilibrium occur at E_2 and the households who possesses $\hat{n}_2^1{}^*$ number of family labour force can only be tied them in interlinked contract. Total number of such households is N_2. Considering $n_2^1{}^* > \hat{n}^1{}_2$ & $n_2^1{}^* > \tilde{n}_2$ it can be concluded that the tied households cannot only cross their reservation level of earnings but also can cross the poverty line. But the problem of involuntary unemployment now becomes more acute and becomes N^*N_2.

Concluding observations:

In the village community we see the constant interaction between the landlord and the tenant. The landlords mainly play a dominant role in the village economy. The landlord in this type of interlinked contract prefers short period under fixed rent system. The fixed rent system also encourages the tied tenant to get maximum output from the field because they know that, working only as an agricultural labourer it will be difficult for him to maintain even a subsistence level of consumption. But an agricultural labour household can bind himself in an interlinked contract provided it has certain number of family labour force. Otherwise he will opt to work purely as an agricultural labourer or in the non-farm sector. If it is observed that sufficient number of families with a required number of family labour forces is available in the village economy then all the tied households will be ultimately kept at reservation level of income and the problem of involuntary unemployment will disappear. Other wise in the presence of shortage of interested agricultural labour households with required number of family labour force the problem of involuntary unemployment will emerge. At this situation the tied households

now can keep themselves above the reservation level of income. Again in our model if the equilibrium number of family labour force determined in the village economy at which the interlinked contract actually happens exceeds $\tilde{n}_2$ then we can conclude the tied households not only can keep themselves above the reservation level of income but also are able to cross the poverty line through interlinked contract.



Povertv line

family labourforce

Fig-1

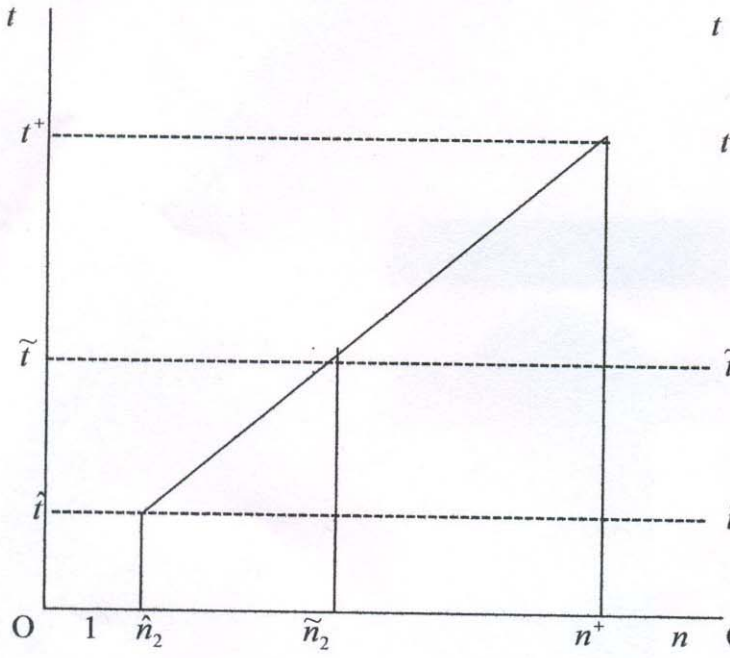


FIG-2A

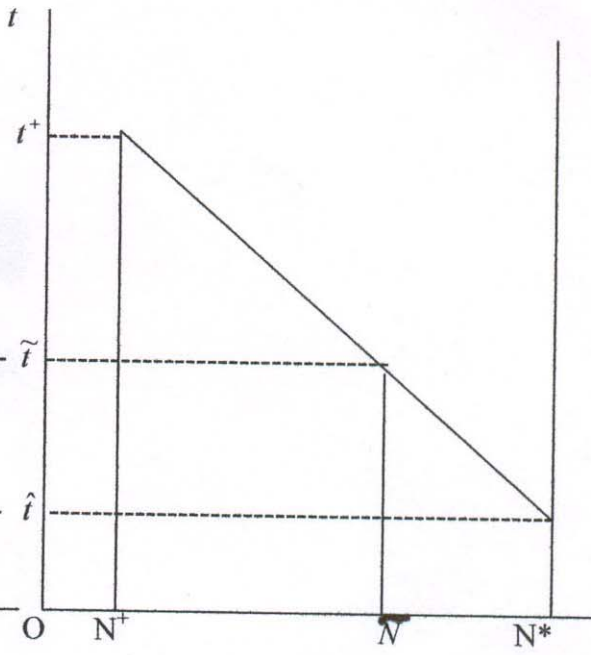


FIG-2B

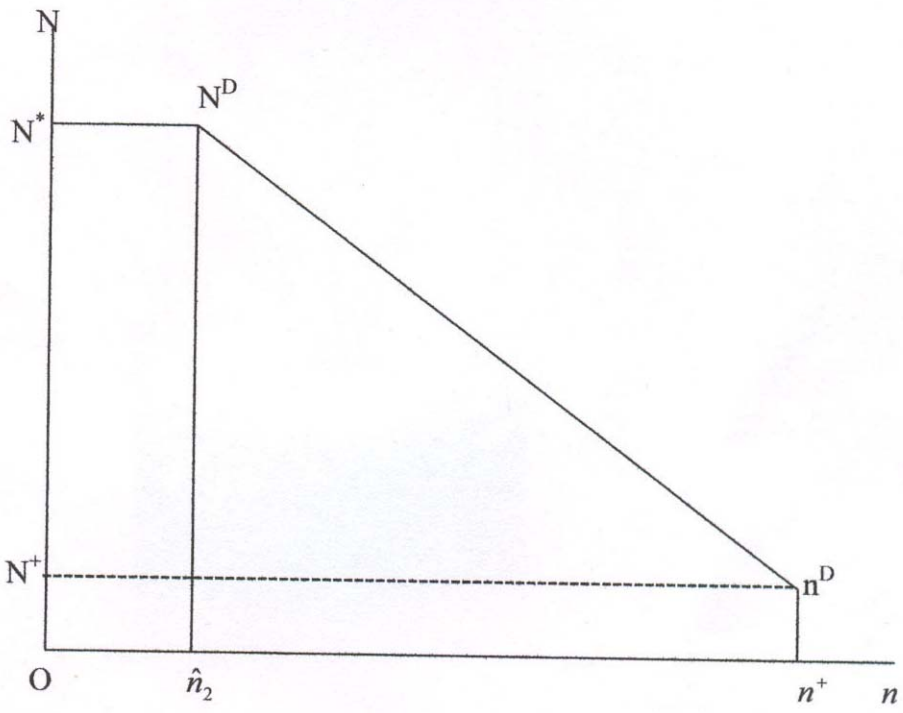


FIG-2C

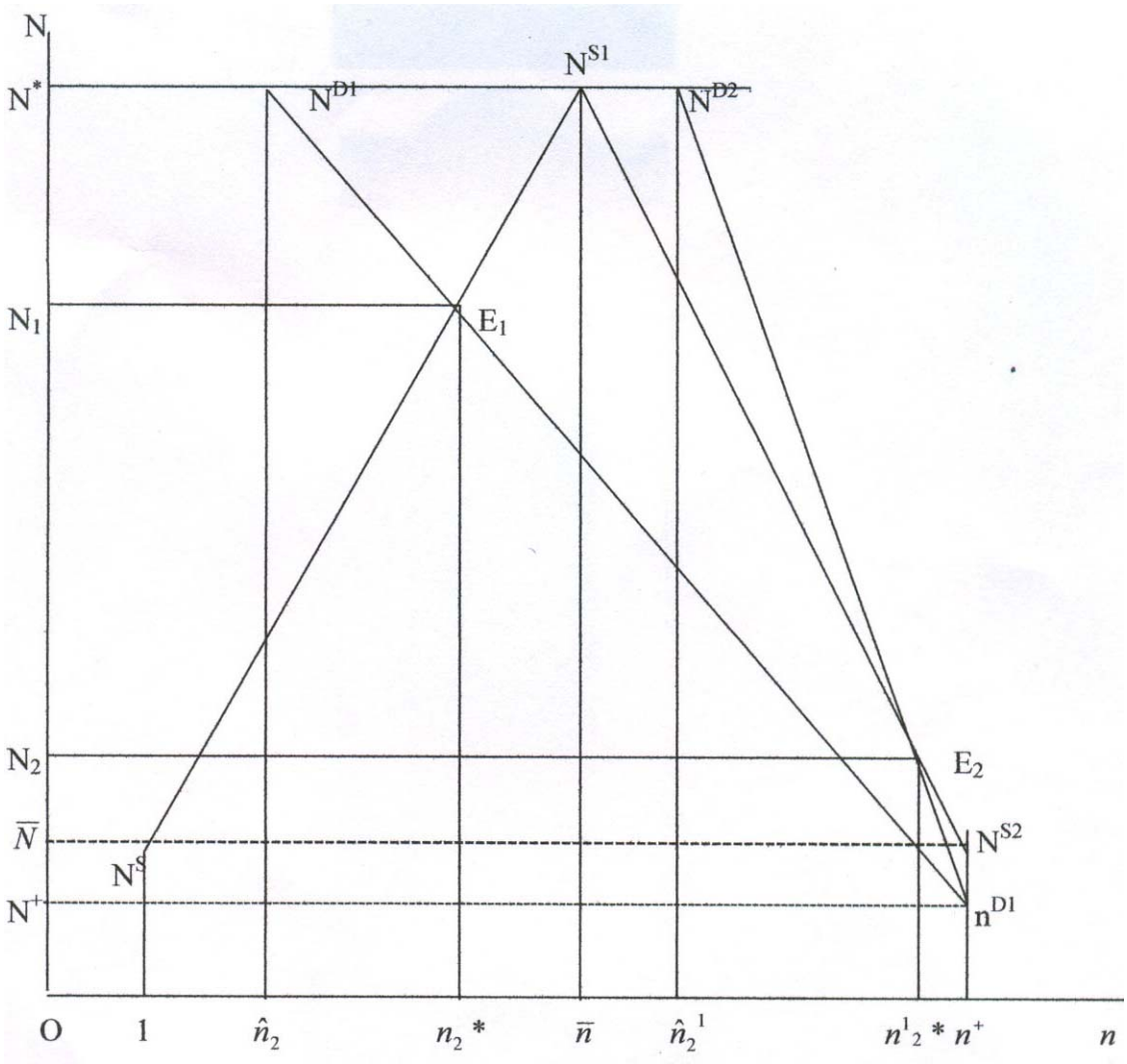


FIG-3

References:

Bardhan Pranab and Ashok Rudra (1978), '*Interlinkage of Land Labour and Credit Relations: An Analysis of Village Survey Data'*, Economic and Political Weekly, Vol-13, No. 6-7.

Battese,G.E.; Coelli,.T.J. and Colby, T.C. (1989), "*Estimation of Production Function and The Efficiencies of Indian Farms, Using Panel Data from ICRIST Village Level Studies*," Journal of Quantitative Economics, Vol.5, pp. 327-348.

Basu. K. (1984), '*The Emergence of Isolation and Interlinkage in Rural Market'*, Oxford Economic Papers 35 .

Bell.C. (1988), "*Credit Markets, Contracts and Interlinked Transactions*", in H.B.Chenery and T.N.Srinivasan (eds), Hand Book of Development Economics, Vol-1 North Holland.

Deolakikar, B.A. and Vijverberg, W.P.M. (1983), "*The Heterogeneity of Family and Hired Labour in Agricultural Production: A Test Using District-Level Data from India*", Journal of Economic Development, Vol-8, No.2 pp.45-59.

Gupta. M.R. (1987), "*The Nutrition Based Theory of Interlinkage*", Journal of Quantitative Economics

Kundu Amit and Chatterjee Biswajit (1998), "*Consumption Efficiency Hypothesis, Credit Labour Interlikage and Moral Hazard : Issues in the Economics of Wage Policies*", The Indian Journal of Labour Economics, Vol-41, No.4

Kundu Amit and Chatterjee Biswajit (2001), " *Choice Between Local Labourer and Migrant Labourer*" The Indian Journal of Labour Economics, Vol-44, No.4

Sarap.K. (1991), "*Interlinked Agrarian Market in Rural India*", Sage Publication, New Delhi