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Employment and Environmental Aspects of Jute

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Jute, the natural fibre, is losing its national importance with the emergence of its substitutes like nylon 66, polypropylene and polyethylene and other kinds of synthetic goods as an outcome of invention as well as innovation in recent times. All are by-products of naphtha cracking of crude oil and gasoline. The reason is that the market provides the incentives in favour of producing and consuming synthetic goods, which are cheap in nominal sense relative to the products of natural jute fibre. Economists do not necessarily believe that the market solves all problems, because market does not always provide the best possible solution to the society so far as environmental damage is concerned. The conflict between economists and ecologists is distinct as we incorporate the dimension of biodiversity into our comprehensive analysis. But these synthetic goods do not degrade both biologically as well as chemically. As a result, social pollution arises as public liability which should be considered as environmental cost of producing/consuming synthetic goods. If we are able to incorporate the social damage into this analysis, the use of hydro-carbon free jute products, perhaps, is to be seen more eco-friendly and healthy in the context of biodiversity and the export share from of jute which are likely to be enhanced in future, so far as property of sustainability of intergenerational distributional equity of well being is concerned. The market price per unit of synthetic goods in the short run is meagre as compared to jute goods because it excludes the environmental cost, however its long run cost in view of sustainability surpasses the prices of jute goods. We may have a bird's eye view of the degree of substitutability by inserting annual production of raw materials of synthetic goods in India. The production of raw materials of synthetic goods, high-density polyethylene (HDPE) and low-density polyethylene (LDPE) gives rise to indistinct idea about substitution. The linear trend equations for the period 1990-98 exhibits increase in the production of HDPE by 50,000 and LDPE by 30,000 tonnes per year respectively (CMIE, 1989-90 to 1998-99). The present generation is enjoying the benefit of biodiversity, loss of biodiversity thus denied to future generation. Soil degradation as a result of the use of polymer is very much relevant. These polymers make a layer in the upper surface of the soil and the natural tilling system does not work well. The agricultural land is adversely affected nutritionally and hence land becomes afflicted from the standpoint of fertility, which in turn affects the usual growth of biomass. So if we are to

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withhold production of and use ethylene, jute market may be stimulated by undertaking invention/innovation in respect of jute products. On the contrary, jute pollutes in three stages: in the processing of jute fibre through retting, in the manufacturing of jute goods (generation of solid waste, discharged polluted water and emission of smoke) with the old technology and finally from the consumption of jute goods. However, the pollutants generated are perhaps below nature's Assimilative Capacity **A** (may be quantifiable)**, A** taken as resource varies from region to region. Our concluding remarks are: use for eco-friendliness.

It is empirically found from the cost-structure of growing jute, that is, the cost on labour in the cultivation of raw jute ranges from nearly 60 to 70 per cent of total cost per acre, as it is a close labour-intensive crop. The costs of required inputs like irrigation, fertilisers, pesticides, and implements are very insignificant as far as cost-structure of our primary data are concerned. The higher relative cost of growing raw jute may be explained by the exaggerated imputed wage of family labour and greater intensity of family labour deployment during the phase of data collection. The data for the study are collected in two phases. One cannot deny that exaggeration of imputed wage of family labour during the survey was distinct. More accurate data may be captured if collection is undertaken in three phases despite lack of awareness of the general farmers. It should be added that jute fibre processing by old retting technique demands greater working hours.

Employment is a cost from commercial point of view, but is a benefit from social point of view. Indeed employment is the only dignified and sustainable means of satisfying the basic needs of the common people. This dual significance of employment should be borne in mind in any people-oriented social planning. Two important points may be the benchmark in growing jute in India. It is a labour-intensive crop that demands relatively large manpower in rural areas, including retting in particular. The on going process of globalisation invites labour displacing technology today and it is empirically established (Bhaumik, 2004) that the rate of unemployment under economic reform is high in the rural sector as compared to urban areas, it has a complementary role in the growth of rural employment in an agrarian society. Again the labour cost percentage of market value of final output is comparable to other crops in such a way that it is not the exclusive characteristic of jute cultivation. The burden of labour cost may better appreciated if we consider labour cost as percentage of value of output instead of taking relative labour cost. In this respect it is comparable. Secondly, it is out and out an eco-friendly crop, which does not harm the biodiversity, or its use/production has no negative externalities. The dilemma of rapid industrialisation under globalisation and preservation of green environment demands workable human atmosphere.

We applied our own methodology to estimate empirically how significantly, if at all, labour can be saved in jute cultivation, or the estimation of surplus labour. The methodologies developed on our own to estimate surplus labour are applied to primary data and the derived result does not convey much about the existence of

surplus labour due to bad fitting of regression equations. Katwa is one of the sub-divisions of Burdwan district. The villages under survey are within the geographical territories of Nadia, Murshidabad and Birbhum districts as these are borderline districts of West Bengal. The economy of Katwa is exclusively based on agriculture and rural non-farm activities. The jute crop occupies a very small area under cultivation in Burdwan district relative to Nadia, Murshidabad, North and South 24-Paraganas. From the cost-structure of raw jute it is concluded that the most important item of cost components is labour, covering 60 to 70 per cent of total cost. At the present stage we try to investigate the reasons behind the higher cost of producing raw jute in Burdwan district, especially in the Katwa sub-divisional area. The relatively high cost of cultivation of jute may be explained by either higher wage rate or greater amount of employment per acre. Although low productivity of agricultural labour may raise the cost of growing jute owing to the worse technical competence at the farm level or due to the bad management or due to the depleted resources at the disposal of the farmers. In our present area of study we hypothesise that there exists considerable amount of surplus labour that may cause the cost of production of raw jute to rise relatively high. In the present context an attempt is made to estimate quantitatively how significantly, if at all, does surplus labour exist in jute cultivation. We try to give attention to the methodology of measuring it, that it can be free from weakness as far as possible. We try to use such methods, that do not depart from the original concept of surplus labour, though it is difficult to estimate disguised unemployment from the production point of view, because it is not easy to find the actual case of withdrawal of labour, with other things remaining the same. Such a withdrawal may take place side by side with changes in other factors of production. Thus the direct method of measuring surplus labour is hardly applicable in respect of the available data. Let us now consider some indirect methods of ascertaining surplus labour.

One indirect method of measuring surplus labour is based on the postulation that production of raw jute per acre is proportional to the proportion of family labour to total employment. Total employment per acre is supposed to increase as employment of family labour relative to total employment increases, because the work equilibrium reaching to marginal productivity is equal to zero, instead of marginal productivity is equal to wage rate. The higher the proportion of family labour to total employment corresponds to greater output per acre, if the existing workers perform their full quota of work. Accordingly, because of the later work equilibrium, the farm with higher proportion of family labour is assumed to correspond to greater output. If the output per acre is found to be inversely related to the proportion of family labour to total employment, it signifies that labourer per acre increases, but labour per acre does not increase, that is, workers are not doing full quota of work indicating the existence of surplus labour. The existence of surplus labour may also be estimated by the magnitude of output elasticity with respect to employment. If the value of output elasticity with respect to employment is lowest it indicates that production

responsiveness to the change in employment pattern is much smaller, signifying the existence of surplus labour. The farm level primary data through some field work and regression analysis may help us to get quantitative relationship between the explained and the set of explanatory variables, and other statistical tools could also be applied for data analysis.

Another indirect method of estimating surplus labour is based on the relationship between employment per unit of output and proportion of family labour to total employment. The existence of surplus labour may be justified by the fact that both employment per unit of output and the proportion of family labour to total employment move in the same direction. It signifies that labour per unit of output increases as employment of family labour relative to total employment increases. It means that with the increase in employment of family labour the work effort or work intensity per worker is declining, the resulting effect is that the growth rate of employment is greater than the growth rate of output. This approach of estimating surplus labour is to be applied by taking primary data.

We may approach the subject in another way: the surplus labour is the excess of actual employment over the required employment. The estimated required employment is based on certain norms. No small farm will use hired labour unless its family labour is exhausted, and there is no surplus lobour on a farm where only hired labour is employed. On a farm where only hired labour is used, the actual number of workers may be identified with the number of workers required, since it may be reasonably assumed that each hired labour is doing full load of work in a competitive labour market. Thus, we consider the farms where only hired labour is used as standard farms, where actual employment is treated as required employment. Now, we classify the whole set of farms into two groups, one group consists of standard farms where the proportion of employment of family labour to total employment is zero and the second group consists of non-standard farms where the proportion of family labour to total employment is positive. After formation of two distinct groups, we try to find the quantitative relationship between total required employment per acre and production of jute per acre of the standard farms with the assumption that employment of required labour is proportional to production per acre. With the help of this estimated equation, if it is well fitted, we may find estimated required employment per acre corresponding to each and every production per acre of non-standard farms. If the estimated required employment falls short of actual employment, the estimated surplus labour is positive. The empirical work depends on primary data and we shall try to select farms in such a way that agro- climatic conditions remain the same for all the farms.

To verify the above proposition we collected primary data covering 51 farms in Nadia and Burdwan districts in October 1998. The farms belong to the villages of Gangatikuri, Goalpara and Bikaihat of Burdwan district and also the villages of Matiari, Sadhuganj of Nadia district. The villages are selected on the basis of convenience. The farms belonging to different villages are selected on the basis of

purposive sampling. Here, the method of jute cultivation is found to be highly labour intensive, from land preparation to harvesting and final processing of jute, the farms hardly used any sort of mechanical devices. It is observed that the relatively large farms, which rarely appeared in our sample, are almost based on hired labour. On the contrary, there is a tendency on the part of small farms to use greater proportion of family labour to total employment. Still the organisation of farm structure is almost the same for all adjacent farms.

By assuming linear and log-linear relationship we regress the production of raw jute per acre (Q) on total employment per acre (N), and the total employment per acre (N) on proportion of family labour to total employment (P) in respect of primary data. The estimated equations are given below:

$$Q = \underset{(7.24)}{8.98} + \underset{(1.20)}{0.01}N \qquad R^2 = 2.87\%, \quad D\text{-}W = 1.34$$

$$N = \underset{(30.95)}{98.98} - \underset{(-1.01)}{7.41}P \qquad R^2 = 2.06\%, \quad D\text{-}W = 1.04$$

$$\text{Log } Q = \underset{(3.07)}{\text{Log}1.58} + \underset{(1.56)}{0.17}\text{Log}N \qquad R^2 = 4.76\%, \quad D\text{-}W = 1.04$$

$$\text{Log } N = \underset{(122.95)}{\text{Log}4.64} - \underset{(-0.36)}{0.17}\text{Log}P \qquad R^2 = 0.26\%, \quad D\text{-}W = 1.01$$

So for as R^2 and t- ratios are concerned the quantitative relations are bad fitted. The variations of the values of the dependent variables are not explained by the variations of the values of independent variables. The above set of equations does not provide us in establishing watertight argument favouring the existence of surplus labour in jute agriculture.

To follow the second method of measurement we take the employment per unit of output (E) as explained variable and proportion of family labour to total employment (P) as explanatory variable. We regress employment per unit of output (E) on proportion of family labour to total employment. The data fitted to both linear and log linear equations are as follows:

$$E = \underset{(26.77)}{8.48} + \underset{(0.02)}{0.01}\ P \qquad R^2 = 0.0009\%, \quad D\text{-}W = 1.06$$

$$\text{Log } E = \underset{(51.35)}{\text{Log } 2.12} + \underset{(0.05)}{0.0004}\text{Log}P \qquad R^2 = 0.0005\%, \quad D\text{-}W = 1.09$$

Both the values of R^2 and t-ratios in both functional forms hardly favour any significant relationship between employment per unit of output and proportion of family labour to total employment. The resulting empirical findings render that the existence of surplus labour in our area of study becomes very indistinct explained by these bad fitted relations.

This way of measuring surplus labour (Approach III) is based upon the existence of standard farms in the sample with which we compare non-standard farms. In our sample of 51 farms we have only 17 farms that employed only hired labour. We have the data on employment per acre (N) and production of raw jute per acre (Q) of 17 standard farms. Now by assuming linear relationship we regress required employment on the production of jute of 17 farms deploying zero family labour and try to identify the best-fitted equations. The Ordinary Least Squares (OLS) method gets the best-fitted estimated equations.

$$N = 15.39 + 6.87\,Q$$
$$(26.11) \quad (2.56)$$
$$(0.57) \quad (2.67) \qquad R^2 = 32.35\%,\ \text{D-W} = 1.10$$

$$N = 8.34\,Q$$
$$(0.35)$$
$$(23.36) \qquad R^2 = 30.84\%,\ \text{D-W} = 1.18$$

$$\text{Log } N = \text{Log}2.58 + 0.17\text{Log}Q$$
$$(0.70) \quad (0.30)$$
$$(3.63) \quad (2.61) \qquad R^2 = 31.32\%,\ \text{D-W} = 1.05$$

$$\text{Log } N = 1.90\text{Log } Q$$
$$(0.02)$$
$$(76.46) \qquad R^2 = 29.31\%,\ \text{D-W} = 1.48$$

The log-linear equation with the intercept is relatively well-fitted equation so far as t-ratios and R^2 are concerned, though it is not supposed to be best fitted. Now, corresponding to each and every production (Q) of 34 non-standard farms we obtain the corresponding expected required employment, by comparing the actual and expected required employment we identify the farms rendering expected surplus labour, as actual farm employment surpasses the expected required employment the surplus labour at the farm level probably exists.

Now we are in a position to classify the farms where the expected surplus labour is positive. Out of 34 non-standard farms, we have only 20 farms exhibiting positive surplus labour as per our Approach III. But the expected surplus labour may not be equivalent to actual surplus labour. To verify the effectiveness of approach III we apply again the first method on such 20 farms. The estimated linear equations are as follows:

$Q = 7.14 + 0.29\ N$
(2.16)1. (0.02) $R^2 = 8.62\%$ D-W = 1.74
(3.3) (1.3)

$\text{Log } Q = \text{Log } 0.83 + 0.32 \text{ Log } N$
(1.05) (0.23) $R^2 = 9.5\%$ D-W = 1.69
(0.79)1. (1.37)

$N = 98.93 - 7.18\ P$
(3.59) (8.14) $R^2 = 4.14\%$ D-W = 1.48
(27.55)1. (-0.88)

$\text{Log } N = 4.53 - 0.02 \text{ Log } P$
(0.04) (0.03) $R^2 = 2.06\%$ D-W = 1.47
(94.5) (-0.62)

If surplus labour actually exists on each of the 20 farms, the proportion of family labour to total employment and the total employment moves in the same direction and production is responsive when there is a change in employment. To verify the effectiveness of our third method it is being strongly established that values of R^2 for all quantitative relations improved as compared to the first set of equations. However, the relative smaller values of R^2 and t- ratios corresponding to final set of equations do not reflect the reality. Accordingly, we cannot establish strongly that surplus labour exists actually even in such 20 farms where the expected surplus is positive. Perhaps the application of third approach, where farms deploy positive surplus labour, to the first method, helps us in finding disguised unemployment. So we cannot deny, our approaches are supplementing an estimation of disguised unemployment quantitatively. However, farms are relatively efficient from the standpoint of utilisation of labour force even in the situation where disguised unemployment may be present in rural agriculture.

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