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CAPACITY UTILISATION AND PROCESSING COST IN TECHNICALLY SPECIFIED RUBBER INDUSTRY IN INDIA

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This paper examines the constraints in the growth and capacity utilisation of the Technically Specified Rubber (TSR) processing industry in India. The study was based on a census of 51 TSR processing units, conducted across different sectors covering the five-year period from 2001-02 to 2005-06. TSR constituted less than 12 per cent of the total production of NR and the capacity utilisation was only 54 per cent during the year 2005-06. Less demand and margin, increasing cost of processing, processing based on the systems of "advance sales order" or "contract" triggered by market and price uncertainties, the position of processors as price takers in both the input and output markets *etc.* were the major factors responsible for the poor growth and low capacity utilisation of the industry. As a result, the unit cost across the industry, sectors and size classes, does not reveal a significant inverse relationship with the scale of operation and production. The processing units were found to be surviving with context - specific managerial practices.

Keywords: Advance sales order, Capacity utilisation, Contract processing, Market and price uncertainty, Processing industry, Technically specified rubber.

INTRODUCTION

Various promotional programmes have been initiated and implemented since 1973 by the Government of India through the Rubber Board to boost up the production of Technically Specified Rubber (TSR) in the light of its advantages to both the producing and consuming sectors and its growing demand at global level (Jacob, 1984; George, 2002). However, the production and consumption of TSR constitute only 12 and 16 per cent, respectively of the total natural rubber (NR) produced and consumed in the country (Rubber Board, 2007), though it accounts for more than 60 per cent at global level (IRSG, 2008).

In India, capacity utilisation of the industry has also been reported to be less than 60 per cent. Higher capital investment, shortage of raw materials, inefficient use of available working days and higher operational costs (Nair *et al.*, 1977; George, 1988; George and Kumaran, 1990), higher cost of field latex, competition from crepe units, unremunerative pricing of TSR grades, lack of demand (Reichhold, 2003), higher energy cost of processing (Nair and Rajagopal, 2006) and inconsistency in the quality of TSR produced in India (Ravindran, 2005) were the major factors responsible for the poor growth and lower capacity utilisation of the TSR industry.

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However, unlike the trends observed during the pre-reforms period, the demand for TSR has been on the increase during the post-reforms period as evidenced by its import. The share of TSR in the total import of NR, which was only 20 per cent in 1991-92, increased to more than 80 per cent during 2006-07 (Rubber Board, 2007). New units have entered into the processing industry and the existing units have expanded their capacities in response to the increasing demand and the modernisation and export incentive schemes implemented by the government since 2001. Though George and Kumaran (1990) examined the relationship between cost of processing and profitability of the TSR processing industry during the pre-reforms period, no attempt has so far been made to account the relationship and influence of cost of processing on the capacity utilisation of the industry, especially during the post-reforms period. Therefore, the objectives of this study were to examine (a) the trends in production and installed capacity of the processing units, (b) nature of relationship between cost of processing and capacity utilisation in different sectors of the industry *viz.*, public, private, public limited companies (PLC), co-operatives and estates and (c) to analyse the reasons for lower capacity utilisation.

MATERIALS AND METHODS

The paper is based on a census conducted during the year 2006-07 covering 51 licensed TSR processing units. The study covered the details of these units for the period from 2001-02 to 2005-06. The analysis was based on the information collected from 48 units [Private-28, Public-1, Cooperative-7, Estates-9 and Public Limited Company (PLC-3)] as adequate data were not available from three units. Both the licensed and actual installed capacities were estimated to analyse the extent of capacity utilisation and average cost of processing. Licensed capacity refers to the level of capacity of the units at the time of their establishment (year of establishment was different for the units) whereas the actual capacity shows the level of capacity of units during 2005-06 achieved through modernisation and expansion programmes implemented by the Rubber Board since 2001. Capacity utilisation is the ratio of actual volume of TSR produced to the potential output. The number of crepers and its balancing with the capacity of driers represents the potential or capacity of a unit. Therefore, drying capacity is the installed capacity of a TSR unit.

Cost of processing was estimated using the straight-line method on annual basis and is classified into operational, overhead and other costs. Operational costs include the cost of power, fuel, wages and other direct charges required for processing; overhead costs involve administration (salary, PF, gratuity, bonus, medical allowance, *etc.*) and establishment (rent, taxes, insurance, printing and stationary, postage and telephone, *etc.*) and the costs under 'others' include marketing costs (packing material, loading and unloading, transportation, commission to agents/brokers, *etc.*), interest, depreciation, repairing and maintenance, miscellaneous, *etc.* Raw material price is the major cost component and hence, the costs need to be maintained within the margins [price of TSR (ISNR 20) minus price of field coagulum (FC)]. If the processing cost is less than the margin, the unit earns profit and *vice versa*. Profit/loss and margin of the private sector were estimated separately as its unit cost was less than that of other sectors and the industry. The profit/loss and margin of the estate sector also were estimated

separately as its margin depends on the price of superior grade, *viz.* ISNR 5, which constitutes the major share in the total production of this sector. Price of FC was considered in the estimation of cost as it was the major input in the processing of TSR. Price of FC is estimated for 100 per cent dry rubber content (drc).

Theoretically, the unit cost (per kg) of processing is perceived to be inversely related to the scale of production due to the operation of the laws of variable proportions and returns to scale in the short and long-run. Hence, correlations were estimated by fitting the Ordinary Least Square (OLS) model at 5 per cent of significance to observe whether the unit cost had such relationships with the scale of operation and production. The relationships across the sectors and industry were related to both the scale of operation and production but they were not statistically significant. In the case of five units, the unit cost was positively related to scale of operation and production. Therefore, the estimation was repeated after excluding these five units, but the result remained statistically insignificant. Hence, estimation was carried out to know whether the expected inverse relations existed in any particular size class of capacity utilisation across the sectors. Accordingly, taking the median value of five-year data and adding and subtracting 10 per cent each from the median value, production was classified into three size classes as units producing up to 1200, 1200 to 2000 and more than 2000 t. Sectorwise relations were estimated based on this classification in relation to the unit cost of processing. Estimation for the public sector was not considered as it had only one unit. To understand the relative performance and issues concerning the TSR sector, analysis was also carried out at both the aggregate (industry) and disaggregate (sectorwise) levels.

RESULTS AND DISCUSSION

Installed capacity, production and capacity utilisation

Though there had been improvement in the scale of processing over the past two decades, the average daily installed capacity of the industry ranged only from 10-20 t compared

Table 1. **Sectorwise installed capacity (t) of TSR industry in 2005-06**

Sector	Licensed capacity per day	Actual capacity per day	Licensed capacity per annum	Actual capacity per annum
Private	9.30	13.67	81225	118950
Public	20.00	20.00	6000	6000
PLC	11.00	10.00	9600	9000
Cooperative	9.50	10.00	19800	21900
Estates	3.83	5.78	10350	15600
Total			126975	171450
Unit average (per day)*	8.82	10.37	—	—
Industry average (per day)	423.25	497.95	—	—

* Weighted

to 50-200 t in other major NR producing countries. Table 1 shows the sectorwise annual and daily licensed and actual capacities of the units in India during 2005-06. The actual installed capacity of 171450 t of the industry was 35 per cent higher than the licensed capacity. Private sector had the highest shares of 64 and 69 per cent, respectively of the licensed and actual capacities followed by the cooperative, estates, PLCs and public sectors. The actual installed capacity of the private sector was 46 per cent higher than its licensed capacity during this period. While the licensed and actual capacities of the public sector remained the same, they were slightly higher in the cooperative and estate sectors. This was also obvious in the average daily actual capacities (AC) compared to the licensed capacities (LC) concerning these sectors. The average actual capacities per day of a unit and the industry were only 10.37 and 498 t, respectively.

Table 2 shows sectorwise shares in TSR production during 2001-02 to 2005-06. An asymmetrical pattern in the production was observed as the private sector contributed nearly 69.63 per cent of total production followed by cooperative (13.93%), estate (8.04%), PLC (5.56%) and public (2.84%) sectors. Except for the private sector, the growth rate of production in other sectors did not depict any increasing trend. Therefore, generally, a notable increase in the capacity utilisation could not be observed in the industry as illustrated in Table 3.

Table 3. **Sectorwise and industry-level production and capacity utilisation in 2005-06**

Sector	Production (t)	Capacity utilisation (% of LC)	Capacity utilisation (% of AC)
Private	66963	82.44	56.30
Public	3189	53.15	53.15
PLC	4206	43.81	46.73
Cooperative	11453	57.84	52.30
Estates	7186	69.43	46.06
Industry	92997	73.24	54.24

Capacity utilisation of the industry was only 54.24[1] per cent of the actual capacity leaving 45.76 per cent as underutilised even after more than three decades of the inception of the industry. Sectorwise actual capacity utilisation also substantiates this paradigm. The units under the private sector recorded the highest utilisation but only with 56.30 per cent followed by public (53.15%) and cooperative (52.30%) sectors. PLCs (46.73%) and the estate (46.06%) sector realised less than 50 per cent of their actual capacities.

Cost of processing

Cost of TSR included the price of FC and the operational, overhead and other costs.

Table 2. **Sectorwise shares (%) in TSR production**

Year	Private	Public	Coop	Estate	PLC	Total	Production (t)
2001-02	66.09	1.47	19.46	7.37	5.61	100.00	56156
2002-03	67.75	2.99	15.57	7.99	5.70	100.00	69642
2003-04	71.78	3.43	9.38	8.92	6.49	100.00	73277
2004-05	70.46	2.90	13.04	8.12	5.48	100.00	78698
2005-06	72.08	3.43	12.22	7.74	4.53	100.00	92997
Average	69.63	2.84	13.93	8.04	5.56	100.00	—

The purchase of FC normally depends on its market price, which always moves in tandem with the price of ISNR 20 which in turn depends on the price of Ribbed Smoked Sheet (RSS 4 grades). Therefore, the processors are in the position of price takers in both the input (FC) and output (TSR) markets.

Table 4 shows the industry's unit cost and profitability. The five-year average unit cost of the industry was Rs. 5.52 per kg, whereas the average margin remained at Rs. 5.17 per kg. Functionally, the industry was on a net loss of Rs. 0.35 per kg during the period under review. Except in two years, the inter-year cost of the industry had also been notably higher than the margin. The sectorwise cost shows that the average cost of the private sector was Rs. 4.24 per kg and its inter-year costs ranged from Rs. 3.87 to 4.53 per kg. This sector was in a profitable position especially during 2001-02 and 2005-06 with an average profitability of Rs. 0.93 per kg over the period. On the other hand, the average cost of the estate sector was Rs. 8.36 per kg with an inter-year variation of Rs. 7.61 to Rs. 8.83 per kg. This sector was also in a profitable position for three years and its average profitability for the entire period was Rs.0.73 per kg. In the case of PLCs, the average cost had been higher than the margin by Rs. 0.80 per kg and the inter-year cost ranged from Rs.7.11 per kg in the beginning, to Rs. 4.94 per kg at the end. Only in 2005-06 it earned a profit of Rs. 0.66 per kg. Cooperative sector was the only sector which witnessed significant loss throughout the years as its average cost was Rs. 6.73 per kg, leaving an average loss of Rs. 1.56 per kg. As against other sectors, the inter-year cost of this sector had been increasing from Rs. 6.04

Table 4. **Unit cost and profitability (Rs/kg)**

Sector	2001-02	2002-03	2003-04	2004-05	2005-06	Mean
Cost of						
Private	3.87	4.08	4.53	4.42	4.17	4.24
Public	16.19	7.87	7.00	8.15	7.64	9.37
PLC	7.11	6.36	5.50	6.46	4.94	5.97
Cooperative	6.04	6.42	6.66	7.07	7.14	6.73
Estate	7.61	8.09	8.37	8.74	8.83	8.36
Average cost of industry*	5.55	5.62	5.80	5.88	5.60	5.52
Price of						
ISNR 20	28.19	37.06	49.01	53.01	64.32	46.32
ISNR 5	32.18	39.57	52.50	58.30	68.49	50.21
FC (100% drc)	21.27	32.67	44.54	48.88	58.38	41.15
Margin of industry**	6.92	4.39	4.47	4.13	5.94	**5.17
Industry profit/loss	1.37	-1.23	-1.33	-1.75	0.34	-0.35
Profit/loss of private	3.05	0.31	-0.06	-0.29	1.77	0.93
Profit/loss of estate	3.30	-1.19	-0.41	0.68	1.28	0.73

* Weighted average. **Margin of the estate sector was calculated based on the price of ISNR 5 as it constituted a higher share in its total production.

to Rs. 7.14 per kg *i.e.* the cost increased by Rs. 1.10 per kg over the five-year period. Among the sectors, public sector registered the highest cost and loss in processing as the average cost was Rs. 9.37 per kg. Though the cost declined from Rs. 16.19 per kg in 2001-02 to Rs. 7.00 per kg in 2003-04, the average loss was Rs. 4.20 per kg over the period.

Minimisation of the cost within the margin was observed to be the major endeavour of all the units. Only less than 62.50 per cent of the total units could maintain the unit cost within the margin (Table 5). Of the 30 units having unit cost within the margin, private sector accounted for 83 per cent, whereas seven and ten per cent respectively were constituted by the cooperative and PLC sectors. In other words, 25 (89%), 2 (29%) and 3 (100%) units of the private, cooperative and PLC sectors, respectively had a cost which was either equal or less than the margin of the industry. The achievement of the lowest cost by using the inputs in alternative combinations with the given level of technology, rather than by increasing the production, was found to be the available choice of all the units.

Table 5. **Classification of units based on average cost during 2005-06**

Unit cost (Rs)	No. of units	Share (%)
Up to 5.52	30	62.50
> 5.52 to 10	13	27.08
> 10 to 16	5	10.42
Total	48	100.00

The share of different factors in total cost across the sector is clear from Table 6. In all the sectors, operational costs were the major cost components, which together constituted nearly 62 per cent of the unit cost of the industry during the five-year period. Overhead cost (establishment and administration) registered the second highest cost with a share of 20 per cent followed by cost under 'others' with a share of nearly 18 per cent.

The power and fuel costs had the highest share in private sector which indicates that lower cost was achieved by this sector by reducing the overhead and other costs. Conversely, the cost of wages and overhead was on the higher side for the PLCs and cooperative sectors, whereas their cost of power and fuel was relatively low. The expenditure of 45 per cent of the total cost for other purposes by the public sector had resulted in increasing the cost of processing in this sector. However, a common predictable pattern in the cost structure could not be observed across the sectors.

Given the above scenario, how the units earned profit and incurred loss are critical

Table 6. **Sectorwise average share of cost components (2001-02 to 2005-06)**

Sector	Cost components (% share)					
	Power & fuel	Wages	Establishment	Administration	Others	Total
Private	47.07	17.18	11.21	6.28	18.26	100.00
Public	32.55	13.49	6.23	3.14	44.59	100.00
PLC	36.70	24.25	18.79	9.40	10.86	100.00
Cooperative	38.77	22.26	18.40	7.30	13.27	100.00
Estate	41.91	19.40	16.90	5.07	16.72	100.00
Industry average	42.87	18.96	14.40	6.05	17.72	100.00

issues. Generally, lower cost in the private sector was the reflection of the advantages of its operational efficiency. The higher level of use of labour on contract, piece rate and production-linked incentives[2] had significantly contributed to achieving a lower processing cost. The use of Biomass Gasifier as an alternative source of energy[3] was started during 2005-06 which also helped the sector in reducing processing cost in the later phase. The absence of flexibilities in economising the operations due to institutional rigidities in response to uneconomic margin resulted in higher costs for the first two years for the PLCs. But, during the subsequent years (except 2004-05) it could achieve a lower cost as the processing was undertaken on contract basis[4]. Despite a comparable rate of profit in the estate sector, lack of modernisation with Biomass Gasifier[5], lower scale of operation, processing of superior grades and higher share of permanent labour (77.38% of the total wage bill) were the reasons attributed to higher cost. Though all the units under the cooperative sector had Biomass Gasifier, very often, the sector-specific institutional as well as administrative rigidities in changing the input-output ratios (mainly the labour force[6]) in response to changing market situations and lower margins resulted in escalating the cost of processing.

Relationship between unit cost and capacity utilisation

Generally, when the capacity utilisation is higher, the unit cost will be lower and *vice versa* (Stigler, 1964; Winston, 1974). The capacity utilisation of the TSR processing industry was only 54 per cent when its average cost was Rs. 5.52 per kg and the margin was only Rs. 5.17 per kg. As already discussed, when the capacity utilisation of public, cooperative, PLCs and estate sectors was lower than that of the private sector, their respective unit cost was higher than that of

Table 7. **Relationship between unit cost and scale of operation and production**

Variable	Coefficient	SE	t-value
Unit cost and scale of operation of *:			
Industry	-0.465	0.481	-0.97
Private	-0.497	0.365	-1.36
Unit cost and production of **:			
Industry	-0.461	0.286	-1.61
Private	-0.470	0.288	-1.63
PLC	-0.455	0.638	-0.71
Estate	-0.410	0.935	-0.44
Cooperative	-0.182	0.984	-0.19
Unit cost and production in the size class of:			
Up to 1200 t	-0.312	0.683	-0.46
1201 -2000 t	-0.452	0.476	-0.95
> 2000 t	-0.051	0.551	-0.09

* Relate to 2005-06, ** Relate to 2001-02 to 2005-06. t-value significant at 0.05 per cent level.

the private sector. Given the context, it was examined whether the unit cost had declined in tune with the increase in scale of operation and production across the sectors and industry.

The relationship between the unit cost and scale of operation of the industry and the private sector during 2005-06 was estimated, but the same relationship for other sectors during the year was not examined as the number of units under each of these sectors was less. The results obtained are presented in Table 7. It was observed that the unit costs of the industry as well as the private sector were negatively related to the scale of operation but were not statistically significant. Unit cost was negatively related to the installed capacity and production across the industry and sectors indicating the presence of advantage of economies of scale. Decline in the unit cost of the private sector was marginally higher when it increased the scale of operation and production followed by the industry in general and PLC estate and cooperative sectors in particular. However, cost did not, generally, decrease in proportion to the increase, either in scale of operation or production across the industry or sectors.

The decrease in unit cost was more in the production size-class of 1201–2000 t followed by the size class producing less than 1200 t, but it was negligible in the size class of >2000 t. However, the rate of decline in the costs across the size-classes was not sufficient as is exemplified by the insignificant relationships. Thus, though there existed an inverse relationship at all levels, predictable relations could not be observed as the estimated relationships were not significant.

Table 8. **Cost components of private sector units (%) having less than sectoral average cost (2005-06)**

Sl. No.	Wages, power & fuel	Overhead cost	Establishment	Administration	Capacity utilisation (%)	Average cost (Rs./kg)
1	60.00	32.47	2.34	5.19	58.15	3.85
2	41.79	32.84	11.94	13.43	96.90	3.35
3	57.80	17.07	17.32	7.80	40.72	4.10
4	60.58	26.20	10.82	2.40	34.71	4.16
5	84.53	9.43	3.77	2.26	85.33	2.65
6	60.77	17.40	7.67	14.16	41.92	3.39
7	79.30	12.33	6.17	2.20	21.92	2.27
8	67.20	21.20	7.60	4.00	38.22	2.50
9	67.07	17.19	12.35	3.39	95.44	4.13
10	52.08	20.54	9.78	17.60	54.17	4.09
11	42.86	51.43	5.71	0.00	92.75	3.50
12	58.23	18.99	13.16	9.62	15.93	3.95
13	76.52	5.26	15.86	2.37	22.44	3.59
14	69.20	22.49	3.46	4.84	68.90	2.89
15	72.16	23.51	1.08	3.24	57.30	3.70
Average	63.34	21.89	8.60	6.17	56.32	3.47
Sectoral average	-	-	-	-	56.30	4.17

Table 9. **Cost components of private sector units (%) having greater than sectoral average cost (2005-06)**

Sl. No	Wages, power & fuel	Overhead cost	Establishment	Administration	Capacity utilisation (%)	Average cost (Rs./kg)
1	72.06	12.47	13.39	2.08	91.24	4.33
2	56.74	23.17	3.55	16.54	58.33	4.23
3	67.62	8.61	22.33	1.44	24.73	6.27
4	66.73	17.40	9.37	6.50	47.39	5.23
5	67.62	20.09	10.87	1.42	65.05	4.23
6	48.06	24.61	17.08	10.25	76.63	4.39
7	46.71	25.48	17.20	10.62	71.22	4.71
8	71.74	17.39	6.52	4.35	51.11	4.60
9	71.80	16.00	6.20	6.00	50.56	5.00
10	77.94	5.77	14.02	2.27	42.22	4.85
11	74.63	12.69	9.51	3.17	37.53	5.36
12	55.40	22.00	10.80	11.80	29.69	5.00
13	78.02	9.62	10.83	1.53	37.52	6.55
Average	65.77	16.56	11.67	6.00	56.25	4.98
Sectoral average	-	-	-	-	56.30	4.17

This indicated that unit cost, irrespective of industry, sectors and size classes, seems to be declining not more through increase in the scale of operation and production but through alternative as well as judicious management of inputs as was evidenced by the negligible share of indirect cost in the total cost of processing. Rather, it was achieved through the strategies of employing labourers on contract, piece rate and production-linked incentive basis especially in the private sector.

The growth in the level of production or capacity utilisation was not sufficient for causing a decline in unit cost at desired level. As a result, the capacity utilisation had not increased even among those units which had a lower unit cost. This is evident from Tables 8 and 9 which illustrate the level of capacity utilisation and costs of those units in the private sector which had the cost lower and higher than the sectoral average cost during 2005-06[7]. It can be seen from Table 8 that, the average cost of 15 units was Rs. 3.47 per kg, which was even lower than the sectoral average cost of Rs. 4.17 per kg. However, the capacity utilisation of these units was only 56.30 per cent. In contrast to this, the average cost of 13 units (Table 9) was Rs. 4.98 per kg, which was higher than the sectoral average cost, but the capacity utilisation was only 56.25 per cent of the actual capacity. Thus, generally, capacity utilisation was forced to be maintained at lower level[8] as the purchase of raw material and its processing had not been depending on actual installed capacity but on the "advance sales order" or "contract" processing (Veeraputhran, 2010). Processing on 'advance sales order' is a system in which processors buy the raw material and process it only after confirming the purchase order or TSR buying contract of a buyer. Normally, processing is domestic demand-driven which is always not only lesser in volume but also not guaranteed on account of the adverse consequences of

market and price uncertainties being observed since the beginning of 1990s. Hence, the processors purchase the raw material sufficient to meet only the requirement of 'advance sales order.' The position of processors as price takers in both the input and output markets and the compulsion to maintain the processing cost within the margin also force the processors to maintain the capacity utilisation at lower levels (Veeraputhran, 2010). As a result, the availability of required raw material was reported to be not an issue as the purchase was limited to meet the requirements of 'advance sales order'.

CONCLUSION

The study revealed that low margin and demand and increasing cost of processing are the proximate factors constraining the TSR processing industry in the country in achieving higher capacity utilisation. As a result, the unit cost across the industry, sectors and size classes does not reflect the theoretically perceived significant inverse relationship with regard to the scale of operation and production. Cost of private sector alone declined relatively more in tune with increase in its scale of operation and production compared to all other sectors. Unit cost was found to decline, at least nominally, only when the processing took place in the economic size class of 1201–2000 t. However, in practice, each unit attempted to minimise the costs more through managerial efficiency than through the expansion of scale of operation and utilisation. This observation is corroborated by the system of processing based on "advance sales order" or "contract". Effectively, expansion of scale had not sufficiently resulted in achieving lower cost *vis-à-vis* higher capacity utilisation. Hence, the industry's fortunes in the post-reforms phase had been primarily determined by non-quantifiable factors impinging on the uncertainties in the input and output markets. Therefore, given the constraints, a consortium approach involving the processing units to confront the rigidities in the input and output markets is essential from a long-term policy perspective. But the most important policy challenge is the formulation of consensual consortium for a crisis-ridden industry where the margin is insufficient to cover the processing cost. It would be possible only in a context when input prices move in tune with that of the output prices (as in other TSR producing countries) instead of the price of RSS 4 grades in the domestic market. Yet, it is another long-term policy challenge which merits due attention in the context of uncertain market for TSR in the domestic market.

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END NOTES

1 Only 34.27 per cent of the licensed capacity was utilised in 1987-88 (George and Kumaran, 1990).

2 Labour on contract, piece rate and production-linked incentives constituted 37, 37 and 22.67 per cent respectively of the total wage bill of the private sector during 2005-06.

3 Of the 28 units in the private sector, 21 had installed Biomass Gasifier during 2005-06.

4 Two of the three units under the PLC sector were closed down owing to heavy financial losses. Later these units resumed the processing on contract system to safeguard the

labourers attached to them. Under this system, the raw material is supplied by others (normally private rubber dealers or those associated with rubber sector) and the units process and supply TSR to the raw material suppliers at an agreed price.

5 Only one unit in the estate sector had installed Biomass Gasifier during 2005-06.

6 Cost of permanent labour constituted 67 per cent of the total wage bill of the cooperative sector.

7 The other sectors were not considered in the estimation as the number of units under each sector was less.

8 Liberalised industrial policy and an environment of competitive market would ensure a situation of higher capacity utilisation at lower cost (Bhagwati and Srinivasan, 1975; Srivastava, 1996).

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