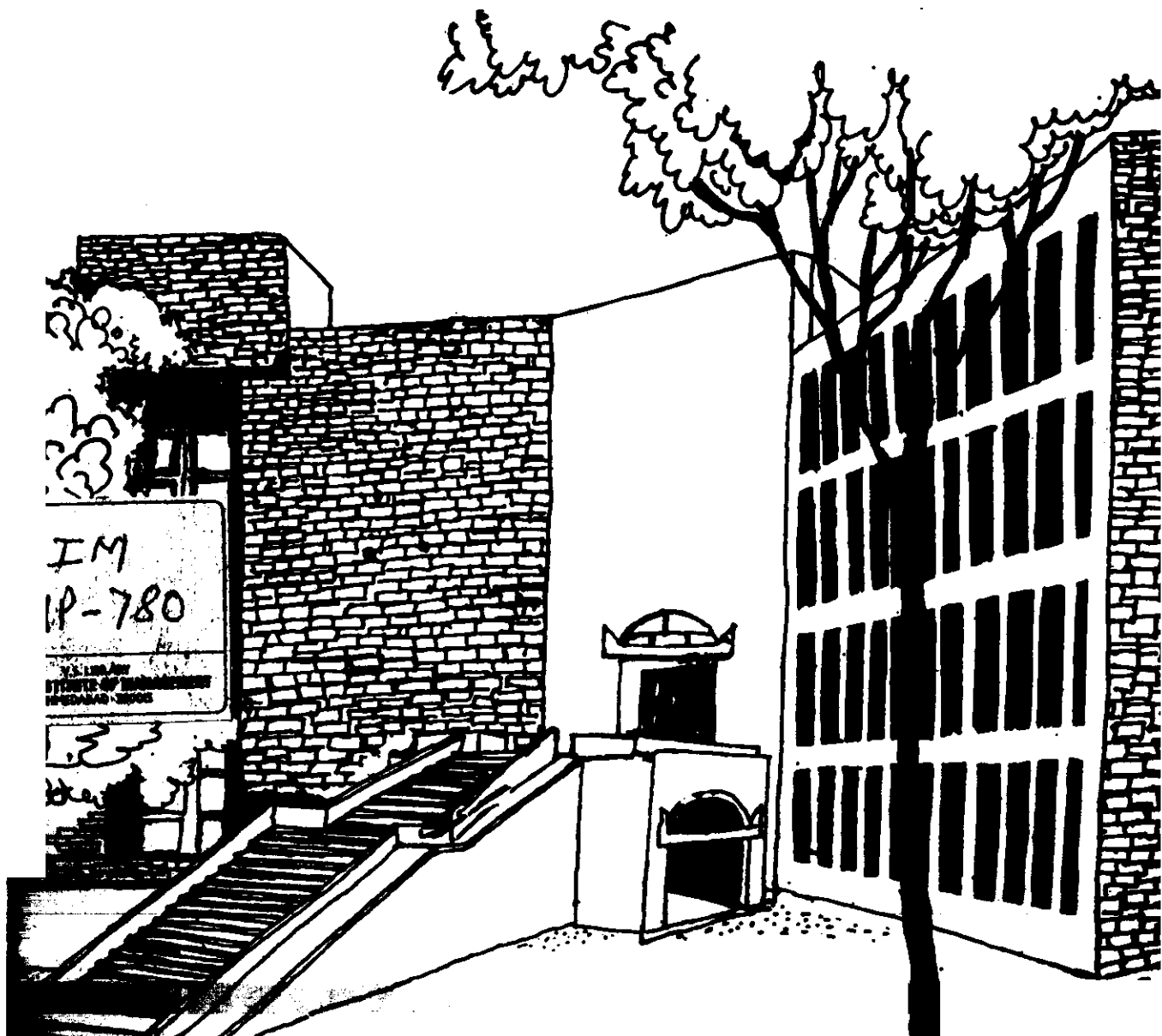




Working Paper



COAL FOR SUGAR PRODUCTION :
ECONOMIC AND POLICY ISSUES

By

Tirath Gupta
Vinod Ahuja

WP780

INDIAN INSTITUTE OF MANAGEMENT

WP

1989/780

W P No. 780
January 1989

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COAL FOR SUGAR PRODUCTION : ECONOMIC AND POLICY ISSUES

Tirath Gupta
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It has long since been emphasised that bagasse can and should be an important cellulosic material for paper and newsprint making in India. Starting 1979, excise duties amounting to Rs.1,500 to Rs.2,500 per tonne have been exempted on paper with at least 75 per cent bagasse content. The sugar mills have, however, been—using the bagasse as fuel. In that context, coal has been suggested as a fuel to save bagasse [GOI, 1965 and 1974]. The shift has also been practised to a limited extent.

The limited experiences, however, indicated that issues pertaining to coal demand-supply management, current and future prices of coal; and their impact on bagasse availability and prices have not been adequately assessed. That is the main objective of this paper. To begin with, we may take stock of the coal inventory.

1. Coal Reserves

The Geological Survey of India in 1972 estimated the country's total coal reserves at 80,950 million tonnes up to a depth of 600 metres, and seam thickness of 1.2 metres and above. Out of that, non-coking coal reserves were estimated around 60,800 million tonnes comprising approximately 12,300 (20 per cent), 22,300 (37 per cent), and 26,200 million tonnes (43 per cent) in the proved, indicated and inferred categories, respectively.

The estimates have since been revised several times to reach 159,300 million tonnes in 1987. That comprised 46,630, 65,320, and 47,350 million tonnes, in the proven, indicated, and inferred categories, respectively. This enhancement has not been due to discovery of new deposits. The revised estimates included deposits in seam thickness between 0.5 and 1.2 metres and those lying between 600 and 1,200 metres from the surface [Chari, 1988].

But, the nation did not have the equipment to exploit the reserves in these categories. Seams thinner than 1.2 metres have neither been mined nor have such operations been planned. Similarly, open cast mining has been limited up to 200 metres, and has been planned only up to 500 metres [Chari, 1988, pp.64-66]. The technical, managerial and financial feasibilities of coal seams less than 1.2 metres, and deeper than 600 metres, thsu, remain to be ascertained.

Let us still assume that the resource would be harnessed. Even then, the known coal reserves may serve for another hundred years [Chari, 1988]. Another estimate has been that 90 per cent of the currently proven and indicated reserves would be exhausted by AD 2130 [Banerjee and Sukhatme, 1988]. Such thoughts may serve to emphasize the need for 'managing the demand' rather than enhancing planned consumption.

2. Coal Production, Demand and Prices

Coal production has been continually rising to reach nearly 166 million tonnes in 1986-87 (Table 1). It can also be observed that Bihar, Madhya Pradesh and West Bengal accounted for more

Table 1 : Production of coal by states of the Indian Union :
1951 to 1986+

(Million tonnes)					
States	1951	1961	1971	1981	1986
Bihar	19(54)*	27(49)	33(45)	51(41)	58(36)
Madhya Pradesh	4(11)	6(11)	13(18)	27(22)	45(28)
West Bengal	10(29)	17(31)	17(23)	21(17)	20(12)
Andhra Pradesh	1(3)	3(5)	5(7)	11(9)	16(10)
Maharashtra	-	-	2(3)	6(6)	12(7)
Orissa	-	1(2)	2(3)	3(2)	7(4)
Uttar Pradesh	-	-	-	2(2)	5(3)
Others	1(3)	1(2)	1(1)	1(1)	-
All India	35(100)	55(100)	73(100)	124(100)	163(100)

+ Excluding lignite

* Figures in parentheses are percentages to total.

Sources: i) GOI, 1982.
ii) CMIE, 1988, p.3-7.

than 85 per cent of the total output. On the contrary, a major portion of the sugar mills' clusters were concentrated in Uttar Pradesh, Maharashtra, Tamil Nadu, and Bihar. That has to have an adverse impact on bagasse prices payable by the paper/newsprint producers.

Coal output during 1989-90 has been planned at 226 million tonnes. That would mean nearly 11 per cent compound annual growth over 1986-87 whereas the observed growth rate during 1980-81 to 1986-87 has been five per cent. More importantly, even the targetted production would be short of the Planning Commission's estimated demand by 11 million tonnes (Table 2). The shortfall could be higher as another demand estimate has been 240 million tonnes raw coal and 7.6 million tonnes middlings [GOI, 1986].

Table 2 : Estimated coal demand by different consuming sectors in India : 1990

(million tonnes)	
Description	Quantities
<u>Coking coal</u>	
Steel and coke ovens	41.1
<u>Non coking coal</u>	
Power	130.0*
Railways	8.0
Cement	12.6
Fertilizer	6.5
Soft coke/LTD	5.0
Brick kilns, etc.	29.0
Export	0.5
Consumption at collieries	4.0

	195.6

Total	236.7

Source: GOI, 1986.

* Plus 9.0 million tonnes middlings.

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A perusal of Table 2 would also show that the demand estimates by consumer segments did not cover the sugar industry. The industry used as fuel at least 22 million tonnes bagasse annually during 1980-81 and 1986-87. Available estimates of bagasse: coal substitution ratio varied from 2:1 to 3:1 [Patil, 1979; Ravindranathan & Rao, 1982, p.17], and the ratio was observed to be as low as 1.4:1 in the case of a newsprint and paper mill which operated on bagasse surpluses due to installation of coal fired boilers at selected sugar mills. Most optimistic expectations, therefore, may be to save two tonnes bagasse for each tonne of coal used as fuel for sugar production.

Thus, a substantial shift from bagasse to coal can upset the delicately balanced coal demand-supply position. The additional coal demand may even necessitate imports. That situation, in turn, would negate the merits of the policy emphasis on enhanced domestic outputs of paper and newsprint.

Limited experiences of bagasse usage by the paper/newsprint mills following installation of coal fired boilers at selected sugar mills did not appear to be satisfactory. In one case, a paper mill installed a coal fired boiler and a primary depithing station at a sugar mill, and accepted the responsibility to supply adequate quantities of coal to the sugar mill. The arrangement, however, was discontinued due to substantially higher than estimated cost and erratic supplies of coal, and dissensions on coal:bagasse substitution ratio. In another case, a paper and newsprint mill, could not obtain the required quantities of coal from the designated sources and obtained it from distances exceeding 2,000 km. As a result of that and a rise in the administered prices, the landed cost of coal at the sugar mills' was nearly Rs.820 per tonnes against Rs.264 estimated in the project feasibility report [Gupta and Ahuja, 1989].

The bagasse based paper mills also appeared to be faced with uncertainties regarding its supplies. In one case, for example, though adequate quantities of bagasse were available at the sugar mills contracted by the paper mill, yet the latter entered into a contract with an additional sugar mill and installed coal fired boilers for them.

Sugar producers can also not be faced with uncertainties in coal supplies. Those who accepted coal fired boilers at the paper makers' behest have retained the bagasse fired boilers. Thus, the paper/newsprint units may be starved of the basic raw material as and when the sugar mills experience or even perceive coal shortage.

This should suffice to suggest a reversal of the policy to encourage coal usage as a substitute fuel for bagasse. That would appear still more desirable with consideration of economic rather than administered price of coal.

Assessing the economic price of a stock resource is a difficult task. But, import parity price can be an acceptable basis where demand and supply are, at best, delicately balanced. The international price of thermal coal has been U.S.\$37 a tonne. Landed cost at Indian ports has been estimated at U.S.\$55 a tonne. At the same time, average efficiency of the internationally traded coal has been reported to be around 60 per cent higher than the indigenous material. Thus, the landed cost of imported coal for the local users could be Rs.950 a tonne (1/). In addition, a most optimistic estimate of annual cost of coal fired boilers at sugar mills has been Rs.370 per tonne of coal.

The economic price of bagasse at sugar factory gates can, thus, be estimated at Rs.660 a tonne (2/). Experience based

1. Includes 25 per cent mark-up for foreign currencies and Rs.300 per tonne for internal transport.

2. Bagasse: coal ratio of 2:1 as discussed.

observations suggest that the landed cost at paper mills would be at least Rs.710 a tonne of mill wet bagasse.

This was nearly twice the highest price of bamboo and hardwoods ever paid by a paper/newsprint producer in India. Moreover, a maximum of 4.5 tonnes of fresh bamboo and mixedwoods may be used per tonne of chemical pulp against six tonnes mill wet bagasse. The nation has the technical, financial, human and natural resources to produce adequate quantities of woody materials. The costs can also not be higher with appropriate management of the resources.

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