

**Table I: Life Cycle Data for Different Materials Used for Packaging One Lakh Tons of 'Atta'**

Material Required (MT)	Jute Bags		Plastic Film Bag	
	Energy (Thousand GJ)	Water (Thousand Tons)	Energy (Thousand GJ)	Water (Thousand Tons)
	1960		680	
Phase I: Production of Raw Material	21.50	1677	38.36	264
Phase II: Production of Bags & Liners	47.19	1506	24.22	296
<b>Total</b>	<b>68.69</b>	<b>3183</b>	<b>62.58</b>	<b>560</b>
Phase III: Distribution	Jute Bags		Plastic Film Bag	
	Fuel (Tons)	Energy (GJ)	Fuel	Energy
	4663	261.29	Taken as Basis	
Phase IV: Waste Management	Jute		Plastic Film Bags	
Recycling Percent	Energy Savings		Energy Savings (Thousand GJ/680 tons)	
100%	Not Applicable		17.20	
80%			13.76	
Incineration	Energy Recovered		Energy Recovered (Thousand GJ/680 tons)	
100%	Not Applicable		35.24	
80%			28.12	

**Table II: Emissions during Phase I and Phase II for Packaging One Lakh Tons of 'Atta'**

For One Lakh Tons of 'Atta'		Jute	LDPE
<b>Air Emissions</b>			
CO	kg	54.3	0.6
CO <sub>2</sub>	kg	6610.2	760.0
SO <sub>x</sub>	kg	134.8	5.2
NO <sub>x</sub>	kg	68.1	4.8
CH <sub>4</sub>	kg	39.5	3.2
HCl	kg	5.3	0.0
Dust	kg	67.6	1.4
<b>Water Emissions</b>			
Suspended Solids	kg	352.3	0.2
Chlorides	kg	4535.5	0.1



### Emission to Air

Phase I of jute involves absorption of CO<sub>2</sub> from the atmosphere but phase II involves emission of CO<sub>2</sub>. This benefit of phase I is lost during the transportation phase, where because of excess weight it leads to consumption of excess fuel resulting in severe atmospheric pollution. The emission of CO<sub>2</sub> for plastic film bags are higher in phase I but leads to overall less CO<sub>2</sub> emission because of its light weight during the transportation phase. The analysis of input effects indicates remarkably high emission of CH<sub>4</sub> emission in case of production of jute. The comparative study on emission during transportation also shows significantly excess generation of CO, CO<sub>2</sub> and NO<sub>x</sub> in case of jute bags as compared to that in case of plastic film bags.

### Emission to Water

As shown in the different tables, BOD and COD to water are unmistakably of highest amount in case of production of jute bags. While these values are negligible for plastic film bags. The COD and BOD values are at least 15-20 times larger in the case of jute bags