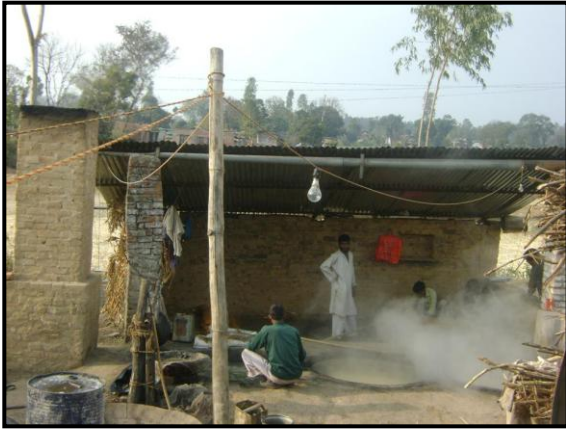


# Energy-Efficient Rural (3-pan) Jaggery-making System

## NEED/RATIONALE

- Jaggery is traditionally made in rural areas of UP, Uttarakhand, Haryana, Rajasthan and parts of MP, Chhattisgarh and Maharashtra in 3 open-pan furnaces using bagasse as fuel. There is huge scope for energy saving and productivity improvements. Energy-efficient systems would reduce cycle time, enabling the Jaggery Units to make more Jaggery during the season and/or save costs, while also reducing quantity of fuel burned thus saving bagasse for sale to the cardboard/paper industry for additional income. Air pollution and emissions are also considerably reduced.
- Crushing efficiency and power consumption of the Sugarcane Crushers used to extract Cane Juice can also be substantially improved, especially in UP, Uttarakhand where vertical-roller “kohlus” are in vogue.



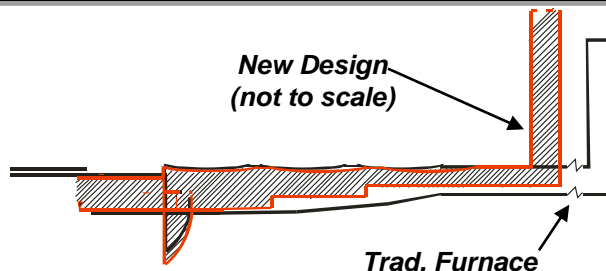
## CTD Energy Efficient Jaggery System

### Furnace

- CTD's improved Furnace has fully re-designed internal geometry including the chimney, and is built using new construction methods with insulating materials at strategic locations. It uses the existing (standard) Pans with steel pins welded underneath the first and second Pans for better heat transfer. New Systems as well as retro-fitted systems with new Furnaces and existing Pans can thus be made.
- Cost of the new Furnace is about Rs.30,000. For new Units, 3 new Pans would cost about Rs.58,000 while retro-fitting existing Pans with pins would cost only Rs.3000.
- the Furnace enables substantially higher number of cycles per day and uses 20% less bagasse.
- Initial costs can be recovered in less than 1 crushing season, with subsequent additional Earnings of about Rs.1 lakh per year!

### Crusher

- CTD's Improved Sugarcane Crushers are available with both horizontal and vertical rollers (because the former are banned in UP/UK!). The improved Crushers give higher yield of juice and also enable crushing of larger quantities of sugarcane per day efficiency. They consume less electric power (or diesel) and also require smaller motors thus reducing initial costs.
- the Improved Crusher costs Rs.1.35 lakhs compared to traditional 'kohlu' crushers costing about Rs.90,000
- Additional investment can be recovered within 1 year!



# Energy-Efficient Jaggery-making System

## Comparative Performance and Benefits

(At 2010 Prices)

Parameter	Traditional	CTD System
<b>Furnace</b>		
Jaggery Output (batches per day)	11	16
Specific Fuel Consumption (Unit bagasse/Unit Jaggery)	1.9	1.5
Bagasse used/season (for 800 tonnes sugarcane)	167 T	132 T
Operational days req'd (for above=88 T Jaggery)	181	125
Value of bagasse saved/sold @ Rs.1000/T	-	Rs.35,000
Labour cost saved @ Rs.1200/day	-	Rs.67,000
Benefit/Profit per Season	-	Rs.1.02 lakhs
Add'l benefit if time saved used to produce more Jaggery	-	+ Rs.25,000
Cost of new Furnace	-	Rs.30,000
Pay-back period	-	< 1 year
<b>Crusher</b>		
Crushing capacity (tonnes sugarcane/14-hour day)	6 tonnes/day	10 tonnes/day
Juice Yield (kg juice/100 kg sugarcane)	63.25	65.00
Additional Juice yield/day (from 10 tonnes sugarcane)	-	175 kg
Electricity consumption per day	98 Units	63 Units
Motor required	10 hp	7.5 hp
Net Benefit/Season from higher juice yield + electricity saved	-	≈ Rs.60,000
Cost of Crusher	Rs.75,000	Rs.125,000
Pay-back period for additional cost	-	1 year



### OUTCOME/STATUS/DISSEMINATION MODALITIES

- The technology can be easily replicated in all those areas where 3-Pan Jaggery Systems are prevalent. At present a Demonstration Unit is running in Sahaspur Block HQ, Dehradun District, Uk. Efforts to set up Demonstration Units in other States/Districts are underway.
- Local youth/entrepreneurs or NGOs could earn supplementary incomes through fees for constructing new Energy-Efficient Jaggery Furnaces with help of local masons. Fabricators already making Jaggery Pans and Sugarcane Crushers could make the new ones as well.
- Technology transfer including turnkey services can be provided by CTD.

Centre for Technology and Development  
D-158, Lower Ground Floor, Saket, New Delhi 110017  
Phone: 011 26524324, Telefax: 011-26862716  
Email: [ctd.delhi@gmail.com](mailto:ctd.delhi@gmail.com)  
Website: <http://www.ctdsess.in>

