

Renewable Energy : Biomass

Presented by

Nuran Nahar Begum

Principal Scientific Officer

Institute of Fuel Research Development,
BCSIR, Dhaka

Introduction ...

- More than 56.38 million tonnes of biomass fuels are being consumed annually for cooking, parboiling, concentrating date palm sugar cane juice etc.
- With the increase of population the use of traditional fuel like wood, twigs, straw etc. also increases.
- Increasing of GHG in the environment due to increased burning of biomass and other fuels is leading to environmental degradation.

Introduction

- To overcome the above mentioned problems, Institute of Fuel Research & Development (IFRD) of Bangladesh Council of Scientific and Industrial Research (BCSIR) has developed a series of improved stoves.

Energy consumptions by sector and also by source for the years 1990

Fig.-1 : Energy Consumption Pattern by Source in 1990 (PJ)

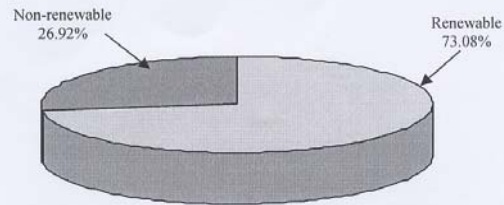
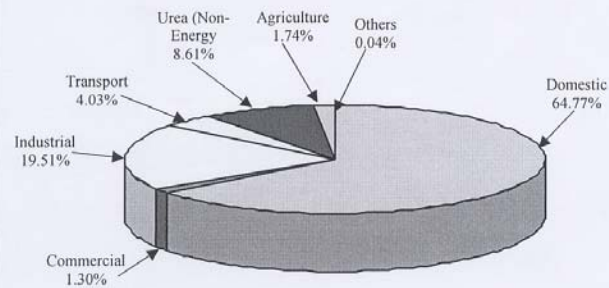
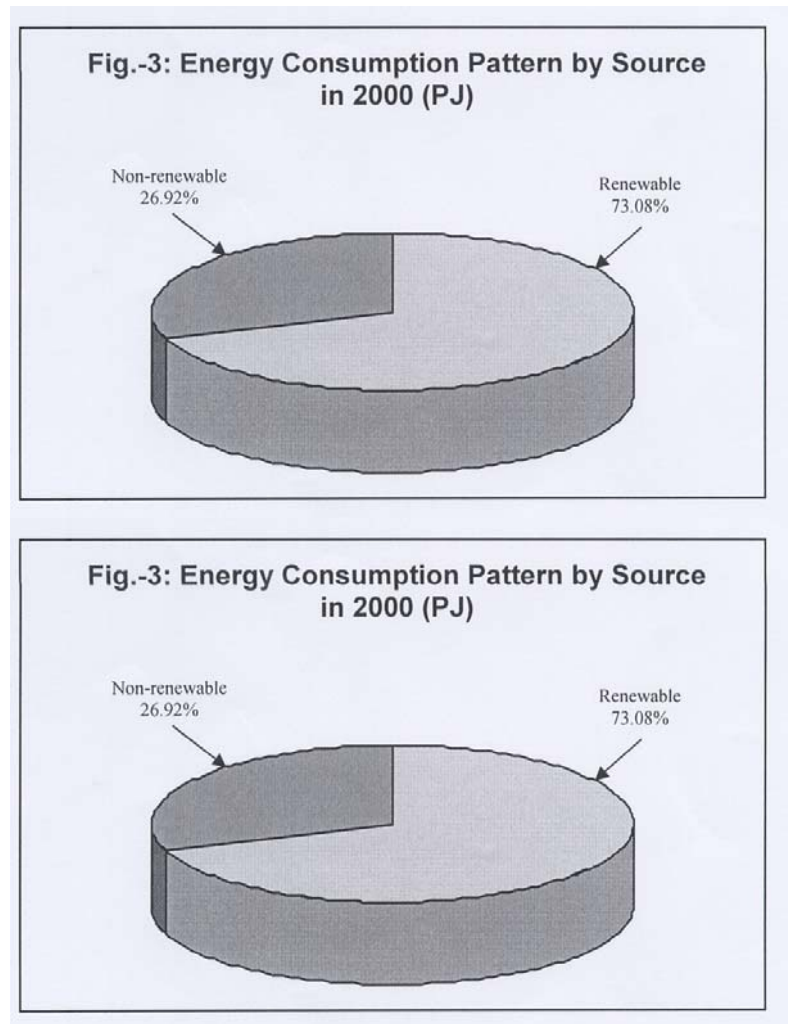


Fig.-2: Energy Consumption Pattern by Sector in 1990 (PJ)



Energy consumptions by sector and also by source for the years 2000



Technology Option

- Improved stoves are mainly classified into two categories:
 - Improved stove without chimney
 - Improved stove with chimney

Improved stove without chimney

- The salient features are:
 - saves 50-55%
 - Construction materials are indigenous.
 - Easy to construct

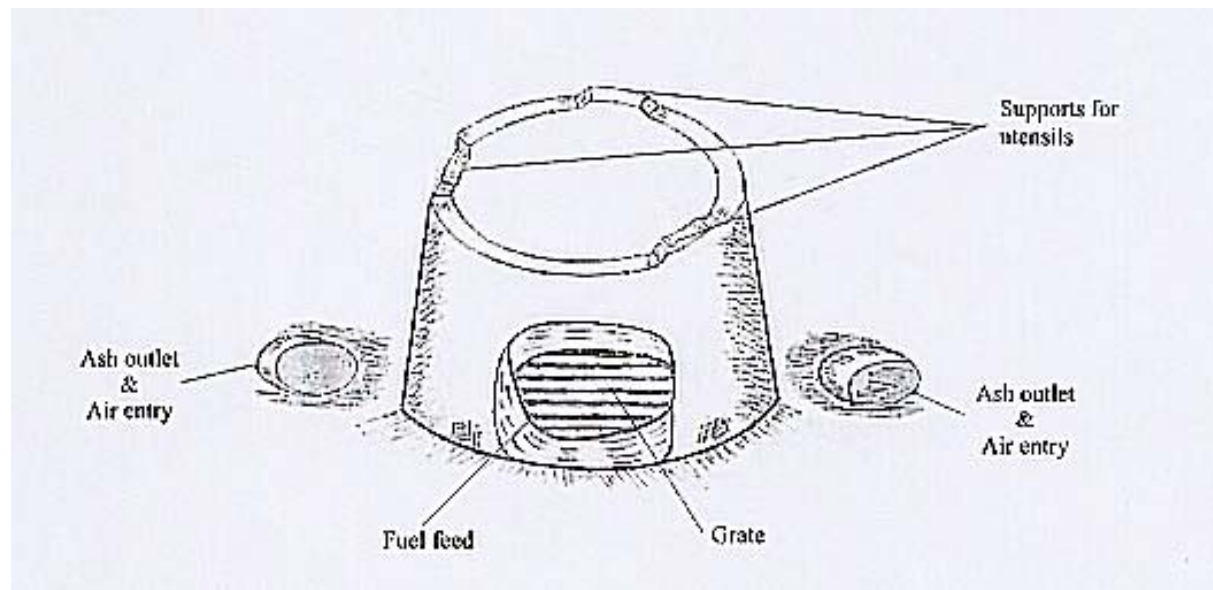
Improved model of single mouth cooking stove with grate (portable)

- This stove is suitable burning, fuel wood, branches etc. and cost of the stove is 50.00Tk.
- It saves 50% fuel.



Improved model of single mouth cooking stove, half underground with iron rod or cast iron grate

This stove is suitable for burning, fuel wood, straw etc. and cost of the stove is 50.00Tk. It saves 50% fuel.



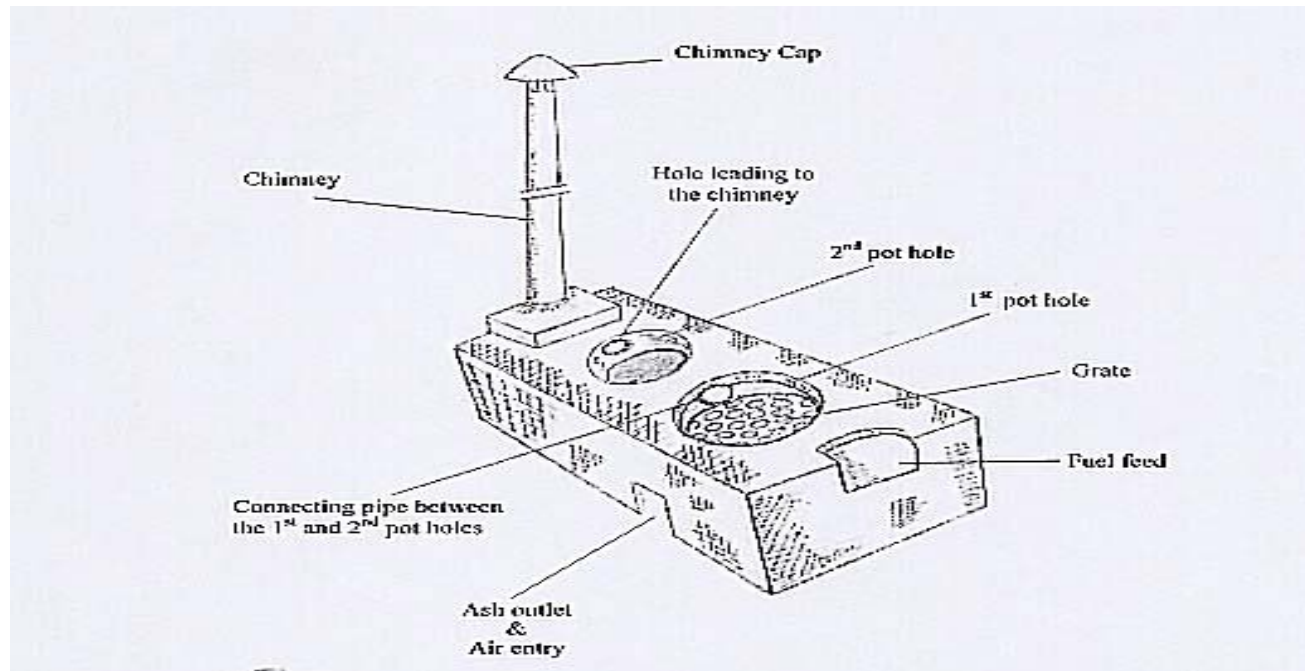
Improved stove with chimney

The salient features are:

- Saves 60-70% fuel.
- Saves 40% cooking time.
- Makes the kitchen smokeless.
- Less fire hazards
- Comfort in cooking
- Reduce blackening utensils.
- Construction materials are indigenous

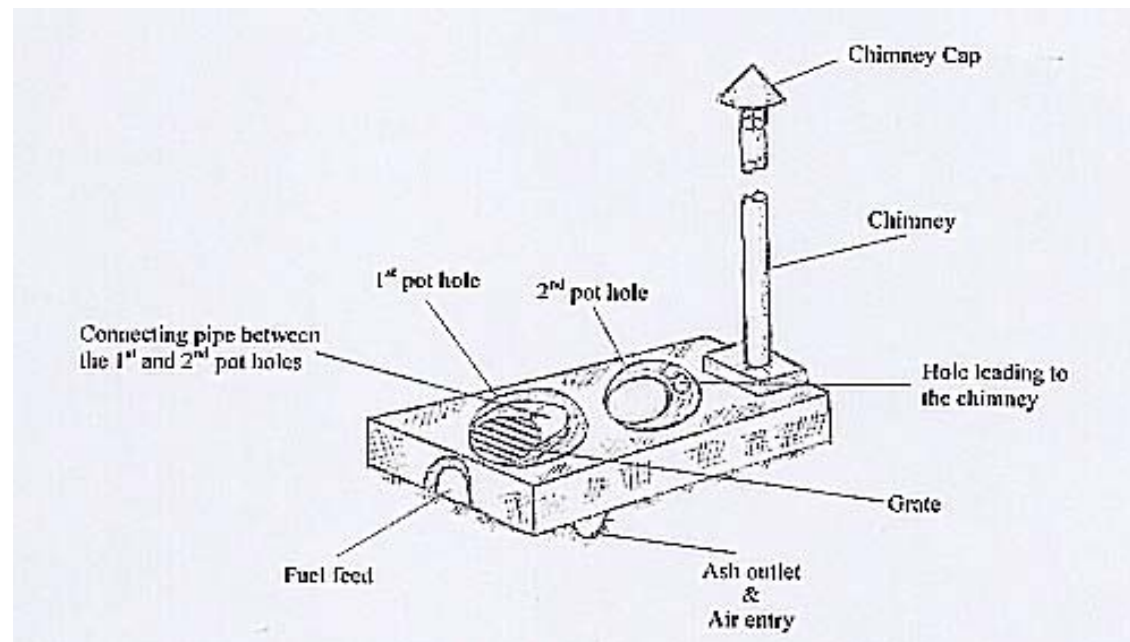
Improved model of double mouth cooking stove on the ground

- This model is suitable for fuel wood, branches, briquettes etc. and cost of the stove is 300.00 It saves about 60-70 % fuel.



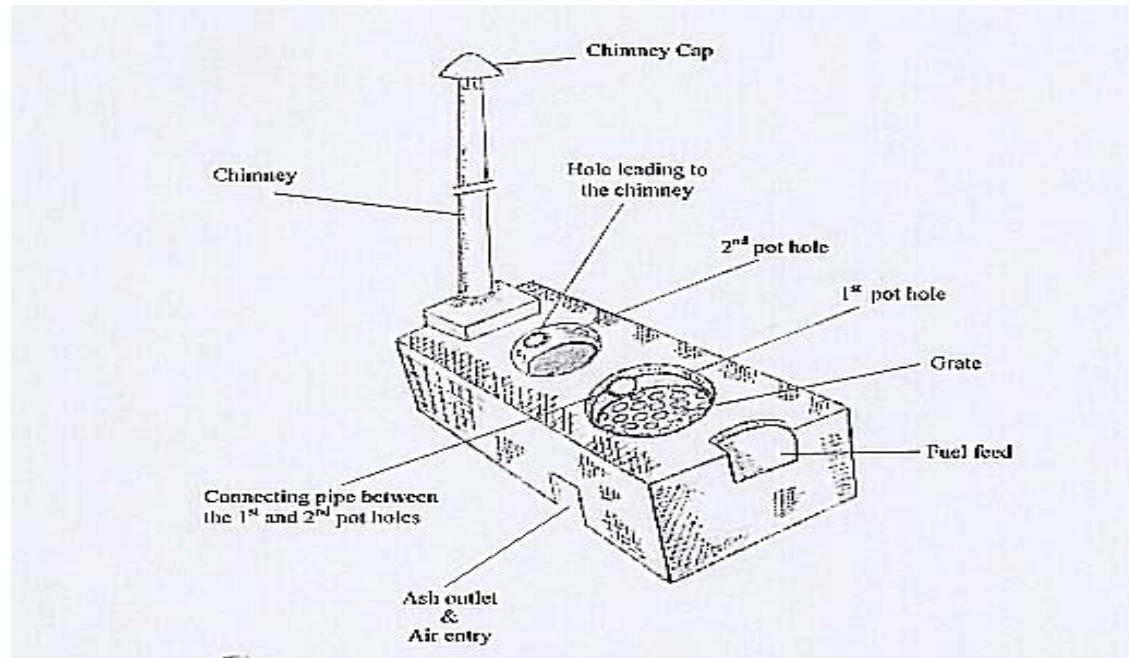
Improved model of half underground double mouth cooking stove

- This stove is suitable for burning fuel wood, branches, straw, leaves etc. Cost of the stove is 300.00Tk. It saves about 60% fuel.



Commercial improved cook stoves

This model is suitable for burning fuel wood branches, briquette etc. Cost of this model is 2000.00Tk. It saves 60-65% fuel.



GHG Mitigation ...

- Yearly consumption of biomass fuel is 56.38 million tonnes
- The total household 25.36 million (census 2001).
- 4% of these households have natural gas connection and 20-25% the households (well-to-do family) have 2 stoves
- The total number of stoves lie between 29 and 30.5 million.
- With 30 million stoves, average yearly consumption was $56.38/30 = 1.88$ tonnes.

GHG Mitigation...

- If minimum fuel saving in an improved stove is 50%, then the savings will be 0.94 tonnes per stove per year.
- If a project has been undertaken for 10 years to install 0.3 million improved stove per year throughout the country, after ten years total number of improved stove will be 3.0 million and net savings of biomass fuel by 3.0 million improved stoves after completion of the project period will be 2.82 million tones per year.

GHG Mitigation

- Present average price of the biomass fuel is Tk 1250/- per tonne; the price of 2.8 million tonnes will be Tk. 3525 million.

Year-wise and cumulative consumption of biomass; year-wise and cumulative productions of CO₂ in the absence of project activity.

Year	Yearly use of traditional biomass stoves (Nos)	Yearly use of biomass fuels (Million tonnes)	Cumulative use of biomass fuel (Million tonnes)	Yearly production of CO ₂ (Million tonnes)	Cumulative production of CO ₂ (Million tonnes)
2008-09	0.3	0.564	0.564	0.414	0.414
2009-10	0.6	1.128	1.692	0.832	1.246
2010-11	0.9	1.692	3.384	1.235	2.481
2011-12	1.2	2.258	5.640	1.646	4.129
2012-13	1.5	2.820	8.460	2.059	6.188
2013-14	1.8	3.384	11.844	2.470	8.688
2014-15	2.1	3.948	15.792	2.882	11.540
2015-16	2.4	4.512	20.304	3.293	14.833
2016-17	2.7	5.076	25.380	3.705	18.538
2017-18	3.0	5.640	31.020	4.117	22.665

Year-wise and cumulative consumption of biomass production of CO₂ and reduction of CO₂ with the progressive installation of improved stoves

Year	Installation of efficient biomass stoves	Yearly consumption of biomass fuels (Million tonnes)	Cumulative consumption of biomass fuels (Million tonnes)	Yearly production of CO ₂ (Million tonnes)	Cumulative production of CO ₂ (Million tonnes)	Yearly reduction of CO ₂ (Million tonnes)	Cumulative reduction of CO ₂ (Million tonnes)
2008-09	0.3	0.423	0.423	0.309	0.309	0.105	0.105
2009-10	0.6	0.705	1.128	0.515	0.824	0.315	0.420
2010-11	0.9	0.987	2.115	0.720	1.544	0.525	0.945
2011-12	1.2	1.269	3.384	0.926	2.470	0.735	1.680
2012-13	1.5	1.551	4.935	1.132	3.602	0.945	2.625
2013-14	1.8	1.833	6.768	1.338	4.940	1.155	3.780
2014-15	2.1	2.115	8.883	1.543	6.483	1.365	5.145
2015-16	2.4	2.397	11.280	1.749	8.232	1.575	6.720
2016-17	2.7	2.679	13.959	1.955	10.187	1.785	8.505
2017-18	3.0	2.961	16.920	2.161	12.348	1.995	10.505

National and Global Benefit

- By installing 3 million improved stoves,
 - net reduction of biomass 0.282 million ton per year
 - net reduction of CO₂ 0.207 million ton per year

Conclusion

Burning over 56 million ton each year spew 41 million ton of CO₂ in the atmosphere causing harm to the environment and the health of the people. Replacement of these traditional stoves with improved ones will reduce emission of CO₂ near about 50%. Thus reducing GHG emission and reducing risk of health problems.

Thank You