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# Assessment of Improved Cooking Stove (ICS) in Firewood Consumptions and Reducing Carbon Dioxide Emission: A Case Study from TMJ Area, Nepal


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# STUDY AREA

- Four VDCs of TMJ area were covered namely; Basantapur, Sungnam, Solma and Tamaphok VDC.
- There were 365 households in the study area with ICS
- Rhododendron Conservation area (28 out of 32 species)
- Altitude ranging from 2000m to 3900m above sea level.

# INTRODUCTION

- Improved cooking stoves (ICS) have potential to have
  - positive impact on health,
  - less firewood consumption
  - time saving
- ICS also has potentiality of reduction in GHGs gas (especially from reduction in $C0_2$ emissions)

- But, information related to ICS and its impact on energy saving and contribution on climate change are not well studied

# OBJECTIVE

## Main objective:

to assess the contribution of ICS on firewood consumption and $C0_2$ reduction in TMJ area.

**Specific objectives** of this study were:

- To quantify the firewood consumption by the ICS compared to traditional stove
- To quantify $CO_2$ reduction from ICS and carbon sequestration through ICS compared to traditional stove

ICS promoters making ICS

# METHODOLOGY

- The research was mainly based on exploratory study
- Both Primary and secondary data were used
- Household  survey was done
- 71 households were surveyed to get necessary information
- Focus group discussion and key informant were also carried out

# SCOPE AND LIMITATION

- Converting one bhari of fuel wood to Kg
- Quantification of firewood into Carbon and carbon dioxide after burning
- Firewood demand and calculation – limited to only kitchen requirement

# FINDINGS

## Social Impact of ICS

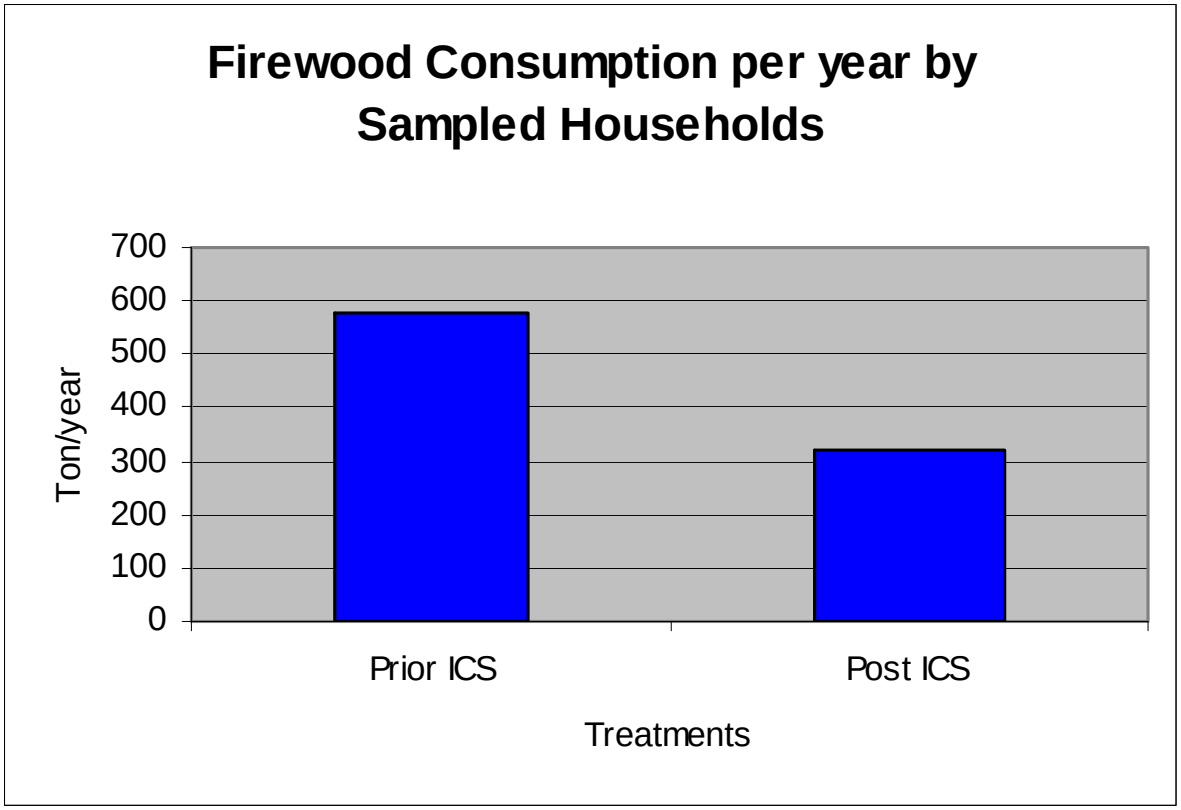
- People saved 44 working days after the use of ICS (1 working day = 8 hours) in one year
- The time saved mostly utilized in other households activities, farming, involving in different organizations( eg. Ama Samuha) and small businesses.
- About 97% respondents were relived from the problems arise due to smoke after the intervention of ICS as they were suffer from optical and respiratory problem before ICS.
- Respondents agreed that their indoor environment much improved after the use of ICS.

# Fuel wood consumption

- Reduction in firewood consumption in the study area
- From sampled 71 hhs

| Conditions | Ton/year |
|---|---|
| Prior to ICS | 578.33 |
| Post ICS | 319.98 |

Reduction %: 44.6



# FINDINGS CONTINUED…

- GHGs emission: Reduction in $CO_2$ emission after using ICS (from sampled 71 hhs)

| Conditions | Fuel wood requirement (MT/yr) | $CO_2$ emission (MT/yr) | $CO_2$ emission reduction (MT/yr) | $CO_2$ Emission reduction MT/hhs/year |
|---|---|---|---|---|
| Prior to ICS | 578.33 | 1058.35 | 472.77 | 6.66 |
| Post ICS | 319.98 | 585.58 | | |

1kg fuel Wood emit=1.83 kg of CO2 ( IPCC,1996)

# FINDINGS CONTINUED…

- Carbon sequestration: Reduction in Carbon emission after using ICS (from sampled 71 hhs)

| Parameter | Fuel wood requirement (ton/yr) | Carbon emission (Ton-c)/yr | Carbon reduction or sequestration (MT/yr) | Carbon reduction (MT/hhs/yr |
|---|---|---|---|---|
| Prior to ICS | 578.33 | 241.74 | 107.98 | 1.52 |
| Post ICS | 319.98 | 133.75 | | |

1kg fuel Wood generates 418 gm carbon equivalent of carbon emission ( Smith et.al. 2000)

# CONCLUSION

- ICS has appreciably reduced the fuel wood consumption up to 44% and it has many social advantages as well.
- it has saved certain time of the housewives in cooking and cleaning utensils which they had diverted to different other activities
- the study reveal higher number of ICS have a strong positive correlation in reducing $CO_2$ gas emission, carbon sequestration and have positive impact on the climate change.

Available online
http://www.hedon.info/docs/BP56_SuppPaper_ICSNEPAL_Khanal_Bajracharya.pdf

# RECOMMENDATIONS

- VDC and DDC should be part of the alternative energy development process and their role especially in facilitation providing resources are to be promoted
- Some basic research on effectiveness of alternative energy such as ICS and its impact on climate change is needed.
- Energy policy should also focus rural energy issues and promotional mechanisms should be well thought in the changing context.
- Further study should be done for accounting carbon and carbon trade.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Thank You