

Evidence of the Impact of Energy Access on wellbeing

Measuring the Immeasurable

Lana Zaman

Energy Division, ESCAP



Questions we will explore:

- **What is the quantified impact** of electricity access/clean cooking on:
 - Economic wellbeing
 - Education
 - Health
 - Inequality
 - Poverty
- **How** do programmes impact these outcomes
- What **specific programme elements** result in change?
- What are some of the **unintended consequences** of such programming?

Rural Electrification



Insights from Development Literature

Electricity Access

Intermediate Outcomes

- Increased electricity use (lights, appliances)
- Information access
- Better public resources

Long-term Impact

- Increased productivity & income
- Education gains
- Health gains

So how do these theoretical benefits figure in real life? Let's take a closer look based on evidence from impact evaluations in the region...

Evaluation Findings: Who benefits most from rural electrification? Evidence in India

Author: Shahidur Khandker

Publication Year: 2012

Country: India

Programme:

- Rural electrification at
the village level



Results



Education

- Girls with electricity attained 6 extra months schooling, while for boys attained 3.6



Income

- 38.6% increase in household income



Inequality

- Richer households benefit more from electrification than poorer households



Similar results were seen in other countries throughout the region

Based on studies from Bangladesh, Vietnam, Cambodia, and India, results were as follows:

Impact	Range
Increase in income	16 – 39%
Increase in children's education	1.5 – 8.5 months
Impact on inequality	Richer households benefit more from electrification than poorer households
Decrease on poverty	Evidence of poverty reduction in Bangladesh and India

Clean Cooking



Insights from Development Literature

Clean cooking

Intermediate Outcomes

- Less pollution
- Less time spent gathering fuel

Long-term Impact

- Improved health
- Women's empowerment
- Education gains
- Increased productivity
- Reduced deforestation

Challenges of Clean Cooking



- Biggest challenge is uptake
- Requires behavior change & cultural shift
- Fuel Stacking
- Very little empirical evidence



Technologies

- Liquid Petroleum Gas (LPG)
- Improved Cookstoves (ICS)
- Biogas Digesters



Evidence on ICS

Pros:

- Relatively cheap technology
- Easy to deploy
- Doesn't require fuel change

Cons:

- Unclean fuels detrimental to health and environment

Evidence based on impact evaluation:

- Little evidence of impact on health and wellbeing
- Maintenance challenges led to low uptake
- Improper usage resulted in little difference in emissions between traditional cookstoves and ICS
- Extensive training and follow up can improve results



Evidence on Biogas Digesters

Pros:

- Relatively cheap technology
- Agriculture co-benefits

Cons:

- Requires livestock
- Cultural resistance
- Maintenance requirements



Evidence based on impact evaluation:

- High uptake
- Reduced expenditure on firewood & LPG
- Less time spent gathering fuelwood

Evidence from LPG



Pros:

- Culturally accepted/well-regarded

Cons:

- Regular distribution channels require strong infrastructure and transportation

Evidence based on impact evaluation:

- High uptake resulting in strong potential for improving health and reducing pollution
- The issue of fuel-stacking persists

Electricity Access Conclusions

1. Bundling electrification service with other amenities can magnify impacts. Public amenities (schools, hospitals, etc.)
2. Maintaining and continuing to improve electricity quality is critical to fully realizing potential benefits

Clean Cooking Conclusions

“Make the clean available instead of trying to make the available clean”

– Sagar and Smith (2014)

1. Address fuel stacking
2. Gender-sensitive programming
3. Highly contextual – best solution depends on local resources, costs, etc.
Basing technology selection on evidence and evaluation helps boost its uptake

Perspectives from Countries (1)

Technologies/ Resource Interventions	Availability	Cost Effectiveness	Environmental Sustainability	Cultural Acceptance
LPG Cookstove	High	High	Medium	High
Natural Gas	High	Medium	Medium	High
Electric Cookstove	Low	Medium	Medium	High
Biogas (crop waste)	Low	High	High	Low
Improved Cook stove (ICS)	Medium	Medium	High	Low
Biogas (animal/human waste)	Low	Medium	High	Low

Perspectives from Countries (2)

Technologies/ Interventions	Resource Availability	Cost Effectiveness	Environmental Sustainability	Cultural Acceptance
Biogas (using animal/human waste)	High	High	High	Medium
Biogas (using crop waste)	High	High	High	Medium
LPG Cookstove	High	Low	Low	High
Improved Cook stove (ICS)	Low	High	High	Medium
Electric Cookstove	Low	Low	Low	Medium

Upcoming Work of ESCAP

Systematic reviews with meta-analysis on electricity access and clean cooking

- Methodical review of all rigorous evidence
- Quantified impacts based on all evidence
- Comparison how impacts varied based on geography, technology selection, and other programme elements

THANK YOU

WWW.UNESCAP.ORG

 UNESCAP

 UNESCAP

 UNESCAP

 UNITEDNATIONSESCAP

 UNITEDNATIONSESCAP

