Indoor Air Pollution Reduction in Peru and Bangladesh: Experiences and Lessons to Date

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VERC

Overview

- Context for pilot models
- Approaches
- Status: baseline monitoring, implementation
- Challenges and lessons

Context for Pilot Models

IAP and ARI problematic

- Peru: High altitude/closed kitchen
- Bangladesh: Dense urban slum/common airspace

Family incomes of<$1/day

- Peru: Isolated rural subsistence indigenous farmers
- Bangladesh: Urban migrant population

Some ICS technology base with evidence for acceptability

- Good potential for entrepreneurship development
- Strong local partners: ICS, community experience, health

Why Peru?

- 8 million rural poor, largely indigenous settled in the Andes region.
- Near exclusive use of biomass for cooking, heating
- Cold and windy weather forces indoor cooking year-round. No or insufficient ventilation
- ARI leading cause of death nationwide (2000)
- Death rates for indigenous children well over twice national average

Why Bangladesh?

- Urban poor: slums of Saidpur and Parbatipur
- Purchase biomass fuels for cooking
- Cook on earthen/mud stoves
- IAP a major problem
- Rickshaw pullers, small traders, tailors, etc.

"*We have to eat, therefore we cook with whatever is available*"

Resident, Saidpur

Building Models for Scale-Up

- Technology introduction/improvement
- Market development
- Behavior change communication
- Strong community participation
- Engagement of local officials, universities, NGOs

Baseline data gathered in 2005

- Survey: Household energy and health practices and perceptions (Peru, BD)
- Indoor Air Pollution: 24-hr CO, PM_4/$PM_{2.5}$ (Peru, BD)
- Health symptoms: spyrometry and survey (Peru)
- Fuelwood consumption (initiated in Peru)

Bangladesh

Preliminary baseline findings

- Cooking period: Avg. $PM_{2.5}$ 610 ± 528 μg/m3 (cooking area) and 531 ± 535 μg/m^3 (living area).
- Non cooking period: Avg. $PM_{2.5}$ 128 ± 104 μg/m^3 (cooking area) and 117 ± 86 μg/m^3 (living area)
- Due to close proximity smoke easily diffuses from cooking to living area.
- ***Question: is installing stoves with chimneys a viable option for smoke reduction?***

Preliminary baseline findings

- Over 98% of households use biomass stoves
- 40-45% of the households cook outdoors in all seasons
- Near 50% of households use wood as the primary fuel. ***Ignitor fuels include: polythene, kerosene, scrap paper, dry leaves etc.***
- Fuel is bought because fuel source for collection is not within walking distance

- Awareness reg. adverse impact of smoke though not specific diseases
- Main source of health information through health volunteers and health committee members
- Over 50% seek treatment from local doctors (non-NGO) and over 30% go to religious healers

Intervention

- Four primary components:
  - **Community participation** through MPA for technology development/adoption
    - Appropriate stove design
    - Formation of action plans and local committees to implement these
  - **Social marketing**
    - Demonstration days
    - Awareness raising materials

Intervention

- **Behavior change**
  - Stakeholder consultation for msg development
  - Message dissemination through health volunteers, local health committees, and folk songs
- **Entrepreneurship development**
  - Identification of potential entrepreneurs
  - Establishment of revolving funds provide micro-loans to stove entrepreneurs

Peru

Preliminary baseline findings

- Survey conducted in 133 households across 23 communities
- Confirmed need for intervention: 100% cook with biomass, mostly wood over open fires in kitchens with little ventilation
- Little to no awareness of health impacts of smoke
- Minimal awareness of ICS or ventilation improvements
- Cooking takes place 2-3 times/day, total of 4-5 hrs/day
- Women are primary cooks in 90% of homes
- Mostly women collect fuelwood, 1-2 times/week
- Survey revealed preferences on radio stations for social marketing
- Indicated other environmental health problems including safe water, hygiene and waste disposal

IAP Monitoring: PM, CO *(Swisscontact)*

Baseline data for 48 kitchens

PM4:

- **88% of the kitchens had levels exceeding the USEPA and WHO ambient 24-hour standard for PM2.5 of 65 µg/m3.**
- **Room levels averaged 635 µg/m^3 for 24-hr period, and 907 µg/m3 during cooking times (9 pm - 5 am).**
- **Levels ranged up to 3880 µg/m3 for 24 hour average and 6312 µg/m3 during cooking period.**

CO:

- **Majority of kitchen levels exceeded the 1-hour and 8-hour standards. Pending further interpretation.**

Health symptom monitoring: Spyrometry

Baseline results:

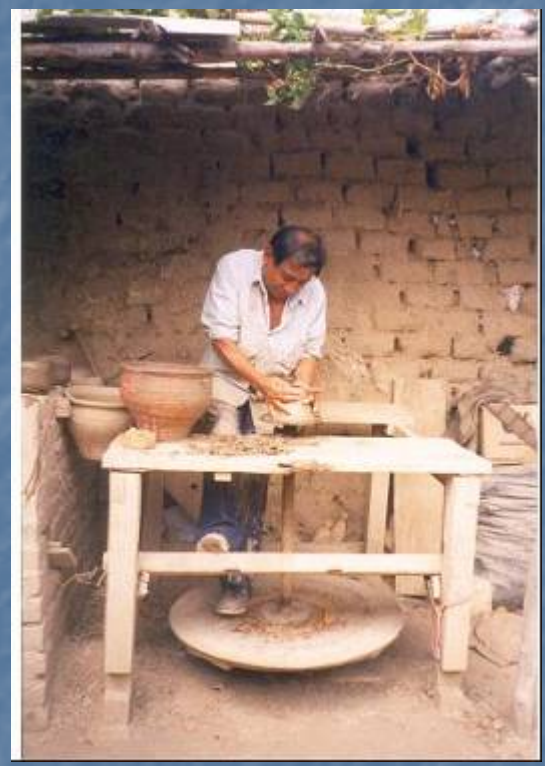
- **Lung damage significant, despite non-smoking population**
- **Men affected as well as women**

Healthy Kitchens for Inkawasi

Technology: locally-adapted, “Rocket”-based efficient stoves and improved ventilation for 600 homes, using local promoters. 23 installed to date in IAP monitored homes.

Healthy Kitchens for Inkawasi

Micro-enterprise:
6 stove builders and
2 ceramic artisans
trained to date.
Kiln constructed
and elbow molds
designed.



Healthy Kitchens for Inkawasi

Micro-credit for increased access: revolving fund of commercialized “animal modules” managed by community environmental health committees in 23 villages. 170 modules distributed to date.

Healthy Kitchens for Inkawasi

Behavior change:
Communication campaign—women promoters, posters, radio spots, “healthy kitchen” competitions

Challenges

- Technology
  - Developing the right cooking technology for dense urban slums (chimneys/none, portability, migrant population)
  - Materials sourcing for rural areas (e.g. appropriate clay, sufficient ash)
- Balancing priorities
  - Among NGOs: health vs. energy focus
  - Implementation vs. monitoring: time, logistics
- IAP monitoring
  - Equipment unsuitable for field conditions: high IAP levels, powerless situations, slum households – space constraints,
  - Challenges with data downloading and computer operation
  - Shipping delays, import duties
  - Data management from different sources/orgs (survey, IAP, health)
- Micro-financing
  - Micro-credit is easier said than done; trust in local experience
  - Micro-loans for stoves a new concept

A few lessons to date

- Some things cannot be rushed: partner capacity in managing new credit concept, awareness raising, adoption of new ideas
- Flexibility to make adjustments is critical to being responsive to local realities
- Good advance planning required when large quantities of material required (e.g. ash and clay)
- New partners need close monitoring, to gain confidence
- Communities need to take ownership to facilitate monitoring and implementation
- Indigenous leaders may be willing to volunteer services if their work gets recognition
- Great opportunities exist to engage health messages into IAP awareness campaign, and vice-versa
- ETHOS connection was valuable with last minute help (Jay Smith)